The Chemical Age

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Contents

NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Machinery and Progress

THE mechanical conveying and handling of products, to which this issue is largely devoted, is a very important factor in modern chemical works practice and to the trade as a whole, for at least two principles which must guide British industry at the present time can hardly be disputed. In the first place, we must increase production, and in the second we should endeavour to eliminate menial and unnecessary human toil. With a million and a half unemployed, the necessity for industry to enlarge its output does not need emphasis; for the most elementary dictum of economics is that wages come out of production. And while men continue to work at jobs which should long ago have been turned over to machinery—and here we differentiate the skilled craft from mere physical labour—we can hardly expect to raise the standard of living as is everywhere desired. It is not to be wondered at that the remuneration of the man who spends his day in lifting heavy weights and wheeling barrows in no way equals that of his skilled rival who is earning his wage with the aid of machinery, and has three times the surplus energy to devote to the other aspects of life which civilisation brings.

The right relation of labour and machinery is nowhere more exemplified than in America, where all who are engaged in industry—and especially the manual workers—regard mechanical aid as their greatest asset. The antithesis of this point of view was well brought out by the case of a distinguished officer during the war. In command of a large depot on the southern coast, he seriously turned down the suggestion that the huts of his camp should be joined by telephone, on the ground that the orderlies would then have nothing to do! The workman who is obliged to exert himself unduly, for want of a mechanical elevator, the navvy who hauls packing cases, and the miner who wheels a barrow load of heavy ore which should be conveyed by a gravity truck—these men can testify to the efficacy of mechanical aids to manual labour, and when the use of such devices as are described in this week's pages becomes the general rule improved production and conditions of work should produce results, the beneficial effects of which it would be impossible to estimate.

B.D.C. Reconstruction

A STATEMENT was published last week to the effect that the Government had decided to withdraw from the British Dyestuffs Corporation. This, to say the least, is premature. The fact, we believe, is that recently it was suggested to the Government, who hold £1,700,000 worth of shares, that they should surrender their shares, as a contribution to the reconstruction of the company, or alternatively that they should sell their shares to the Corporation at an agreed price. The question has been referred to Lord Balfour's Civil Research Committee, but the decision rests with the Cabinet, and this is not expected to be made for some little time. The position at the moment is that the whole matter of the Government's interest in the B.D.C. is under consideration, and no one can say at present what the result will be.

The capital involved, it is true, is a considerable sum, but that is the least important point in the case. The essential question is that of control. While the Government are shareholders or are otherwise financially interested they have a certain power of control or veto over the Corporation's policy. This was effectively exercised recently in the case of the proposed agreement with the I.G. On the other hand, the complete withdrawal of the Government would convert the Corporation into a purely private concern, with power to manage its own affairs as the shareholders thought fit. The Corporation would then stand in exactly the same position as the other private dyestuff

making concerns, with the exception that it has enjoyed in the past certain financial assistance which other companies have not received. It would be free to make any agreements with other interests, as, indeed, any ordinary British company is free to do. Is that too risky a position to create ? The Corporation was financed and supported in the first instance mainly on grounds of national defence, and the complete withdrawal of the Government would mean that dyestuff production was no longer a direct State concern. As against this, it may be urged that there are sufficient dyestuff firms now in existence outside the Corporation to safeguard national needs, and that the time has come when the nation can depend on private enterprise. There are really but three courses open to the Government : (1) To maintain the present position ; (2) to assist the scheme of financial reconstruction by reducing its holding to a nominal amount, but retaining the existing power of veto over arrangements that might affect national interests ; or (3) to withdraw altogether and place the Corporation in the position of a private enterprise. Either course would expose the Government to criticism from certain points of view, but probably the one that would excite the least degree of opposition would be the second.

Chemical Engineering Progress

We have just received from Mr. H. Talbot, the honorary secretary of the Chemical Engineering Group, a volume which contains the proceedings of the Group for the years 1923 and 1924. A glance at the contents immediately conveys the impression that if the subjects dealt with, and the manner of dealing with them, are representative of the normal activities of the Group, then there must be a number of chemists and engineers who, not being members, are losing an unusual opportunity for obtaining first-hand information of a kind which could scarcely be found elsewhere. The fourteen papers which comprise the volume produce a feeling of confidence that their authors are fully conversant with the practical considerations of the particular technique which they are discussing, and in the majority of instances they exhibit that indefinable gift, which is only born of intimate contact with works' processes, of putting their fingers on all those material little side points which make just the difference between complete success and moderate success. The Group deserves the encouragement of all chemical engineers if only for the fact that it is endeavouring—and has already gone some way towards achieving its object—to establish order out of the comparative chaos which was a legacy of the rule-of-thumb practices which governed the design and operation of technical plant and processes until the war brought us to our senses.

In the old days there was practically no exchange of views as between works and works ; there was little in the way of liaison between individuals conducting identical processes ; the social and intellectual standard of superintending officials was, to say the least of it, not a compliment to the chemical industry, with the result that in many cases no really established and accepted methods existed. It cannot be disputed that in the production of some specific substance, in the arrival at some particular end, there must be some definite set of conditions which represent the optimum, some particular design and arrangement of plant which is the most efficient. In the days when profits came easily there was little incentive to interfere with an established routine which had served its purpose over, perhaps, a couple of generations ; but under the changed conditions of to-day it has become essential to get down to details and to concentrate on all those smaller leakages which were treated with indifference in the past. One of the first means to this end is obviously the preparation of standard and accepted data and the systemisation of processes, and work of this nature must plainly be left to a representative body having facilities for the exchange and ventilation of ideas. The Chemical Engineering Group has already made substantial progress with the establishment of standard data, and by the promotion of discussions on chemical processes it has done much to assist in the intelligent operation of works. Given these two, the one remaining need is the intelligent handling of men, a human endowment which, we feel, must continue to remain a matter of individuality and personality, coupled with a capacity for understanding the particular whims of others.

The Future for Synthetic Rubber

The recent sudden rise in the price of rubber takes us back to a situation which existed before the war, when several chemical firms were attacking systematically, and with great assiduity, the problem of synthetic rubber. The fluctuations of prices are intensified by speculative buying and selling and are a direct result of the restriction of rubber output. These changes are bound to have most unfavourable effects on the manufacture of rubber products, for they restrict consumption and thus impede industrial progress, but a point in favour of the Rubber Convention is that it gives the necessary impetus to the development of the synthetic material. The successful production of acetaldehyde from carbide and of ethyl alcohol from coke oven gases allows the manufacture of cheap butadiene, which takes place according to the equation :—

$$CH_3.CH_2OH + CH_3.COH = CH_2 : CH.CH : CH_2 + 2H_2O.$$

With the aid of metallic sodium, butadiene is very readily converted into rubber by a rapid method discovered by Dr. F. E. Matthews. It is believed that the sodium combines with butadiene and is eliminated unaltered, when the conversion is complete. While this is by far the cheapest method of obtaining butadiene and is admirably adapted to British conditions, it is a remarkable coincidence that the most practical method of polymerising butadiene was worked out of this country by Strange and Graham and the Synthetic Products Co., even though these firms were obtaining their butadiene from butyl alcohol yielded by the fermentation of starch in their works at King's Lynn.

It is well known that natural rubber is somewhat differently constituted, being a derivative of isoprene, $CH_2.C(CH_3).CH : CH_2$. Nevertheless, butadiene-caout-

chouc has the valuable characteristics of rubber. It can be vulcanised, is very plastic, possesses great elasticity and tensile strength, and offers considerable resistance to chemical reagents. The production of synthetic rubber on these lines becomes an extremely simple matter and harmonises with the whole scheme of our national industrial development. Coke oven plants and carbide works could be built at the pithead together with synthetic rubber installations to utilise on the spot the available raw materials. The restrictions imposed by nature are far more stringent than those effected by man. The average time between planting a rubber tree and tapping it for rubber is seven years. This compares very unfavourably with the production of butadiene-rubber, which is only a matter of a few days. Thus, even in the absence of conventions, the production of natural rubber is bound to be very inelastic and quite helpless against suddenly increased demands. Considering the difficulties of studying such a complex substance as caoutchouc, the successes already achieved are striking and promise a great commercial future for the synthetic product.

Preparing for a New Fertilisers Act

FIRMS engaged in the fertilisers and feeding stuffs industries would be well advised to study the report of the advisory committee recently appointed by the Minister of Agriculture and Fisheries, some extracts from which are published in this issue. The committee appear already to have consulted a large number of societies, commercial firms, and analytical authorities, and their report illustrates the difficulty of devising standard regulations for a large number of materials that vary enormously in composition. It is clear that they have taken great pains to comply with their terms of reference, and to provide the necessary protection for the public with the least possible inconvenience to the manufacturer or trader. The Committee were appointed :—

(1) To draw up schedules for the purpose of prescribing (a) the fertilisers and feeding stuffs to which all the provisions of proposed legislation on the lines of the report of the Departmental Committee on the Fertilisers and Feeding Stuffs Act, 1906, should apply and those to which only the civil provisions of such legislation should apply; (b) Definitions of each of the articles or classes of articles mentioned above; (c) Statements as to the constituents present and also as to the absence of certain substances in some instances which should be given in descriptions and invoices; (d) Those commodities which should be regarded as worthless or deleterious; and

(2) To recommend the terms in which the valuable constituents should be stated in descriptions and invoices.

They have produced five useful and interesting schedules. The first, which includes articles to which all the provisions of the proposed Act should apply, sets out in parallel columns "general descriptions of articles and classes of articles" and "prescribed particulars of nature, substance, or quality of the article." The second schedule does the same in respect of "articles to which the provisions of the proposed Act, except those relating to the application of a description and sampling on the premises of the seller, should apply." The third schedule gives a series of definitions of well-known fertilisers and feeding stuff materials, which have a distinct chemical interest. The Committee found it impracticable to prepare a list of either "deleterious" or "worthless" ingredients of fertilisers, but have made an attempt at this in the case of feeding stuffs. Similarly, the Committee have been unable to provide for an implied warranty on the part of the seller of fertilisers that the articles sold are suitable for use, because of their doubt whether there are any substances likely to be sold as fertilisers which would be "unsuitable" in the sense that no type of soil would be improved, either physically, chemically, or biologically, by their application.

We have recently published some notes, which have attracted interest, on the extraction of oil and meal from fish, and this matter receives considerable notice in the Committee's observations. It has been found that bacon and even eggs have a fishy taint where the pigs and poultry have been fed on fish meal containing an excessive proportion of oil. The Committee have got over the difficulty by defining "fish meal; fish residue meal" as "a product obtained by drying and grinding or otherwise treating waste of fish, to which no other matter has been added"; while "white fish meal" is defined as a product (containing not more than 6 per cent. of oil and not more than 4 per cent. of salt) obtained in the same way. In every case the sellers will be required to state the percentages of oil and salt as well as those of protein and phosphoric acid.

Points from Our News Pages

The lack of mechanical methods of handling raw materials and finished products in chemical works is commented upon in an article by Mr. H. Blyth. Systems at present used by leading chemical concerns are illustrated (p. 214).

Notes on mechanical conveying and transport appliances, with illustrations of latest appliances (p. 216).

In his second article on modern developments in paint manufacture, Mr. J. G. Bearn deals with further mediums, including oil and varnish, celluloid and nitrocellulose (p. 221).

Extracts from the report of the advisory committee on fertilisers and feeding stuffs appointed by the Minister of Agriculture and Fisheries (p. 224).

Glasgow's chemical works, one of the large municipal undertakings, is handicapped by the low price of sulphate of ammonia, following the increased production of the synthetic sulphate (p. 226).

A consulting chemist, in a practical article, considers that a dye house cannot be run successfully without the co-operation of a chemist. He deals with the main objections raised against such practice (p. 227).

An agreement is reported between Courtaulds, Ltd., and important German artificial silk manufacturers (p. 228).

The London market is quietly steady with improved tone maintained (p. 233).

The Scottish chemical market shows little alteration (p. 236).

The Calendar

Aug. 26 to Sept 2	British Association for the Advancement of Science.	Southampton.
Oct. 4	Société de Chimie Industrielle: Fifth Annual Congress.	Paris.
Oct. 23	Engineers' Club: Annual Dinner.	Savoy Hotel, London

Ropeways and Suspension Railways

Their Application to the Chemical and Allied Industries

By Herbert Blyth, M.Inst.C.E.

The writer draws attention to the noticeable lack in chemical works of facilities for handling by mechanical means both raw materials and manufactured products. A description is given of important systems which have been applied with success by some leading chemical undertakings, and which should be well worth consideration by those contemplating machinery of the kind.

It is correct to say of the ropeway that it is the cheapest of all forms of transport from a "mechanical" handling point of view. It is applicable for practically any kind of material except liquids, and by proper design it can be made an economical proposition for handling capacities of, say, 5 tons per hour and upwards.

Whilst the ropeway is more easily and cheaply applied to straight line traffic, with the modern inventions now available the system is readily adaptable for lines other than straight and for a great variety of working conditions. The commercial value of the ropeway is chiefly due to four important factors, namely, simplicity, reliability, low operating cost, and relatively low cost of construction and maintenance.

The ropeway has, of course, been known for centuries, but its development has been very slow until comparatively

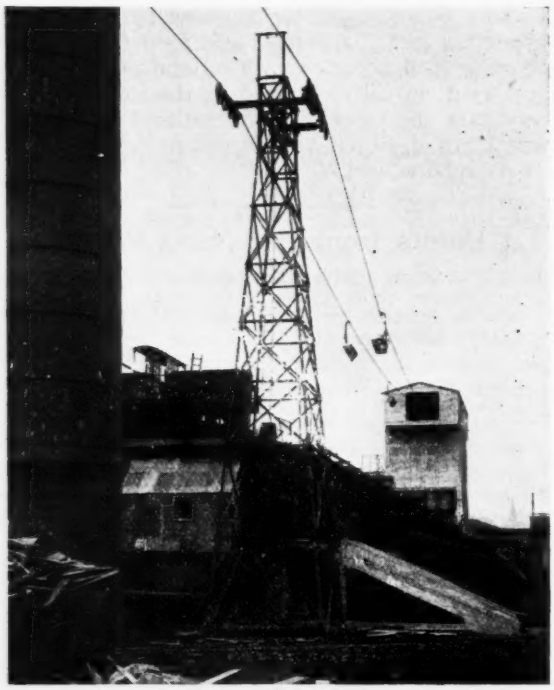


FIG. 1.

recent years, during which mechanical handling has become an absolute necessity with the general development of those industries concerned in the movement of materials over more or less difficult places.

Many improvements have been made which have rendered the ropeway much more useful, not only for long distance traffic over open country, but also for inter-communication on factory sites. The chemical industry in this country has been notoriously slow in taking advantage of the facilities afforded by mechanical handling appliances, and as far as the writer has been able to find the ropeway is one of those things which have, as yet, received very little attention from the managers of chemical works. It is true that a few progressive concerns like Brunner, Mond and Co., Lever Brothers, Ltd., British Drug Houses, Ltd., etc., have installed ropeways of certain types, but there are numbers of other works handling chemical solids in the "old fashioned way"

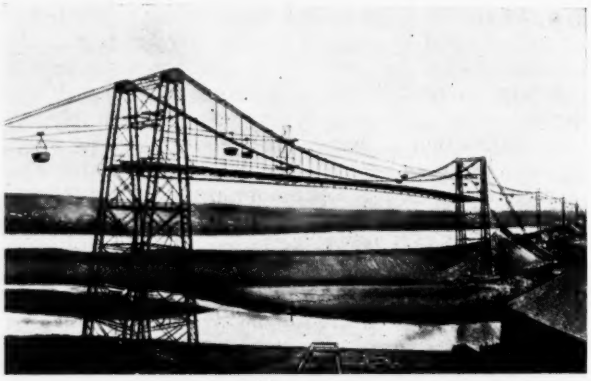


FIG. 2.

when they might be saving large sums annually by giving modern mechanical methods a chance.

It may, therefore, create a little interest if some particular reference is made, first to the various types of ropeways, and secondly to some of the actual installations that already exist in England.

The two main ropeway systems, namely, the mono-cable and the bi-cable, are already fairly well-known, and it is the derivations from these which the writer believes will be of more general interest as far as the purpose of this article is concerned.

The Mono-Cable System

With regard to the two systems named it will, therefore, suffice to say that the mono-cable system consists of one endless travelling rope of sufficient strength to haul and support the load (Fig. 1), and the bi-cable system of two "fixed" ropes generally laid parallel from end to end of the line and connected up at the terminals by rigid shunt rails to form a continuous track for the load; the hauling is done by a separate flying rope of very much lighter construction. (Fig. 2 illustrates a portion of a bi-cable ropeway over the river Weaver erected for Brunner, Mond and Co., at Winnington.) It is to the modifications of the bi-cable system and their development that the attention of chemical works managers may most profitably be drawn.

For instance, there is the "To-and-Fro" ropeway, some-

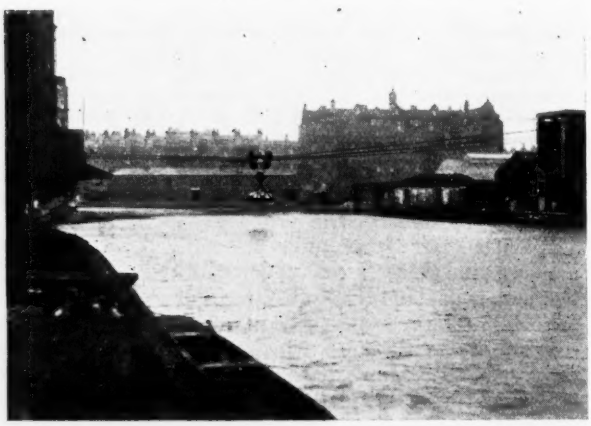


FIG. 3.

times called the " Jig-back " system. This system is essentially a " reversing " ropeway, and it is generally built on the bi-cable system with one fixed track rope. The hauling rope, attached to the load carriage, is reversible and requires an operator to control the forward and return motions. This system is very suitable for relatively small capacities and short distances, and it may be used for light or heavy loads according to the strength of cable and the available means for anchoring the track line; the latter is sometimes an important limiting factor as far as the magnitude of the load is concerned. If the track is required between the upper floors of a factory or warehouse it may not be possible to provide economically for more than a very moderate anchorage. However, generally speaking, the system is a very useful one for light loads.

When the quantities to be handled are more considerable, the " To-and-Fro " ropeway is constructed with a double track. One carrier is operated on each track, but both are attached to one continuous hauling rope, the full carrier going forward and the empty one travelling back simultaneously. It will be understood that the carriers remain firmly clamped to the hauling rope, and provided the driving gear is fitted with a suitable brake the track may be laid at a considerable angle.

Another useful adaptation of the bi-cable system is the cableway on which the travelling carrier is provided with

FIG. 4.

means for hoisting and lowering, both motions being controlled by an operator stationed at one end of the line. Such a plant was installed by Ropeways, Ltd., for the British Drug Houses some years ago, and has proved of immense value and is still in service. An illustration of this plant is given in Fig. 3, and shows the carrier crossing a dock which lies between two warehouses.

Automatic Discharge from Mono-Cable Systems

Fig. 4 shows an automatic terminal for discharging the buckets of a mono-cable system handling limestone and delivering to railway trucks. No labour is required at this terminal. The full buckets on arrival at this station are deposited on a moving flexible shunt rail, on which they are carried round the terminal, passing a fixed trip which causes the withdrawal of the retaining catch. The bucket consequently tips, continuing its passage on the moving rail until it meets the ropeway again, which returns it to the loading station. The trip is adjustable to enable the buckets to be discharged at any point along the hoppers. The capacity of this ropeway is 120 tons per hour.

The Suspended Railway

An important development of the bi-cable system, as far as inter-works use is concerned, is the suspended railway. An excellent example of this is to be seen at the British Portland Cement Works at Magheramorne, Ireland. It was built in 1921 by the British Ropeway Engineering Co., Ltd.,

FIG. 5.

for the purpose of conveying limestone from the crusher to the hopper situated above the raw mill. Fig. 5 is a general view of the plant, and Fig. 6 shows the loading terminal and driving gear under the crusher house.

It will be seen that a rigid rail in this case takes the place of the track cables of the bi-cable system; this is practically the only essential difference.

The total length of the run from crusher to hopper is 465 feet, the difference in level is 85 feet, and the handling rate is 70 tons per hour. Each bucket carries a net weight of one ton, the empty bucket weighs 10 cwt., and the speed is 270 feet per minute.

It will, therefore, be seen that 70 loads per hour have to be despatched from the loading station at intervals of 51·5 seconds, and there are eight buckets on the line simultaneously. The actual power required is 15 h.p., but a 30 h.p. motor was installed in order to meet the worst possible conditions of loading, when the maximum number of full buckets might be ascending without any compensating empties descending. Two angle stations are incorporated, one having a lateral deviation of 7° and the other 28°; the maximum gradient is 22°.

The empties, on reaching the level shunt-rail at the bottom, are automatically disconnected from the rope, and are then pushed along by hand to one of the three filling shoots situated below the crusher.

After filling, they are passed further along to a free rail connected to an automatic weigher which totalises the net weight and counts the number of buckets passing.

Continuing along the horizontal rail to the beginning of the ascent, the buckets are automatically locked to the hauling rope again, and on reaching the tipping point, at the level over the bunkers, the discharge takes place automatic-

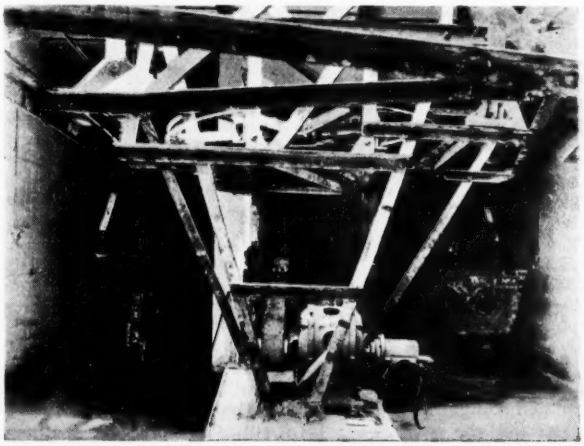


FIG. 6.

ally, without disconnection from the hauling rope; the buckets continue in motion round the return loop and down the return incline to the loading point.

It will be understood that such an installation would be rather expensive in structure for a long track over open ground, but for a comparatively short run for inter-works service, where possibly a considerable portion of the track could be carried upon existing buildings, it can be conceived that the system could be economically constructed and would be of great advantage in many works with handling problems which are somewhat difficult.

The illustrations and brief descriptions will serve to demonstrate some of the useful applications of ropeways within the limitations of a factory site as well as the more extensive conveying facilities beyond the works which are often very costly to secure by any other means than a ropeway.

The writer is indebted to Ropeways, Ltd., and the British Ropeway Engineering Co., Ltd., for illustrations.

Mechanical Conveying and Transport Appliances

This week a large part of our issue is devoted to the subject of mechanical conveying and transport, and particulars of a number of devices for this purpose, together with photographs illustrating their application, are given in the following pages.

Carboy Elevating Trucks

THE use of acids is so universal in chemical processes that the efficient handling of carboys is a problem which touches almost every works. A great deal of waste is incurred through the spilling of their contents, not to mention the considerable danger which attaches to the rough and ready handling of these acid containers. Carboy elevating trucks render such accidents entirely unnecessary and the type designed by H. C. Slingsby, of 89, Kingsway, and 71, Great Queen Street, London, should be of much use in works which employ acids in any capacity. As will be seen in the illustration, the machine both lifts the carboy to the height desired and tilts it for pouring purposes as required. It is claimed that the elevator will raise a carboy in 20 seconds and lower it in 4, and by reason of the tilting arrangement the acid can be emptied with perfect safety. The wire rope pulleys which operate this device are fitted with roller bearings, and elevators are made to lift up to 3 cwt.,

GIRL OPERATING CARBOY ELEVATOR

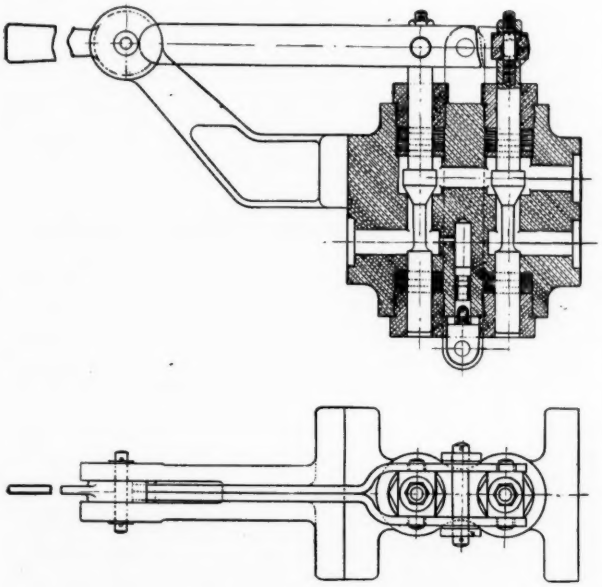
although themselves weighing only 280 lb. The machine is easily operated and the work of tilting heavy carboys is rendered so light as to be done with the least amount of physical exertion.

Other portable elevators made by the same firm include revolving stackers, which will raise boxes up to a height of 12 ft. The travelling platform of these machines is fitted with a swivelling base, which, when the load has been raised, can be made to turn round on its own centre like a turntable. The box can therefore be unloaded at any angle without moving the wheels on the floor, and the travelling platform is fitted with rollers to enable the load to be slid into the space where it is required. Self-loading trucks are also made by this firm, and by a device which grips the packing case to be loaded, the heaviest load can be wheeled about by one man. A hook on the end of a chain grips the load and holds it firmly during transportation. This device also enables the operator to handle cases which are stored closely together, the grip being placed over the top of the load, and the truck pulled over, thereby raising the load.

Hydraulic Valves for Elevators

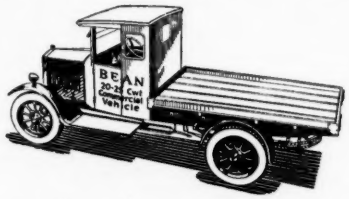
IN connection with conveying machinery and transport Glenfield and Kennedy, Ltd., of Kilmarnock, supply their "Homeyard" patent hydraulic valve as used, for example, to operate railway wagon tipplers for coal conveying, as well as heavy goods hoists and hydraulic dock equipment, in addition to small cranes, passenger lifts, and dock capstans. This hydraulic valve will operate at the very highest pressures, even up to 5,000 lb. per sq. in., without leakage or sticking, so that no tugging or jerking at the control handle is necessary, and in fact a holding down bracket is not even required for the handle. In the case of the smaller sizes, such as are generally used in conveying operations and at pressures of not over 1,000 lb. per sq. in., the valve can be operated merely by the finger and thumb. It is made in two general types, the "double ported" and the "single ported," in a number of standard sizes, the latter (a detailed section of which is shown in the diagram) ranging from ½ in. to 4 in. waterway and the former ½ in.—2 in., the general principle being the same in both cases, the construction generally being of gunmetal, with nickel steel in the case of higher pressures. In the single ported valve the body is bored out to receive two spindles, one of which acts as a pressure valve and the other as an exhaust valve, the two spindles being coupled together at the top by a connecting lever and crossheads. Midway between the two spindles on the lever a pin and two side links are fitted, passing down the sides of the valve body to the under portion and connected together at the bottom end by a gunmetal crosshead. On this latter operates a small ram, the cylinder of which is bored out of the valve body, the hydraulic supply for this ram being taken from the inlet branch of the valve. In this way a constant downward thrust is exerted on the small ram, which is transferred through the side links and lever to the valve spindles. Since the latter have pistons of equal sizes at top and bottom and are therefore in equilibrium, the constant thrust from the small ram tends to keep the valves closed. When the valve handle is moved upwards or downwards it moves the engaging end of the valve lever in the opposite direction and thereby raises one or other of the valve spindles, the one at rest on its seating forming the fulcrum for the time being. If now the handle be raised or lowered sufficiently it throws the end of the valve lever entirely out of a recess in the cam plate, so that it bears on the circumference of the latter and locks the valve in the open position. As soon as the handle is moved back sufficiently to allow the valve lever to re-enter the recess in the cam plate, the small

ram on the under side of the valve body brings both the lever and the handle back to the mid position, closing both spindles down on to their respective seats. The whole operation is extremely easy on account of this balanced action.



Motor Transport

THE use of motor transport is becoming more and more common, and this is due not only to the increased rail rates but to the advantages which conveyance by road has to offer, the most obvious of these being the door to door delivery which it makes possible. The part played by the motor lorry in the chemical trade is considerable, and where it is essential that fresh products be transported for immediate use the necessity of rapid road transit needs no emphasis. Among the commercial motor vehicles made by H. G. Burford and Co., Ltd:, 24, Haymarket, London, their 2½ ton lorries should be suitable for general transport purposes. Their specification includes a chassis which is designed for heavy work, as is shown, for instance, by the back axle. This is of special design, and consists of a dual unit, one taking the load and the other the drive, the former being made of solid drop forged steel. The final drive is by internal gear ring and piston, giving a total reduction of 9 to 1. This form of drive,



it is claimed, is 25 per cent. more efficient and 30 per cent. lighter than any other. The body is fitted with a 9 gallon petrol tank, which allows for long distance work, while the chassis is 17 ft. 10 in. over all, so that the lorry is a manageable unit.

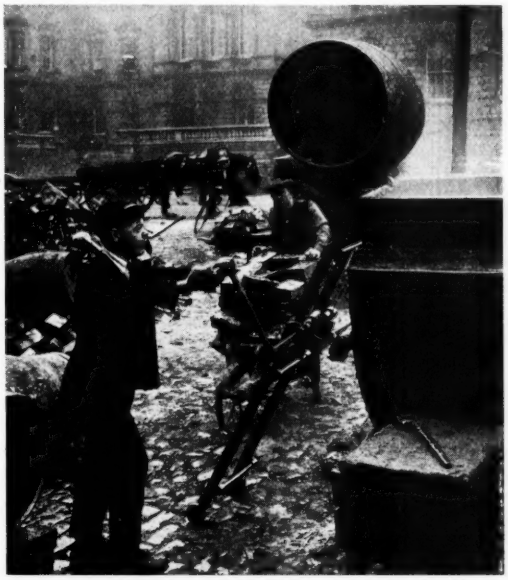
The various types made include a chassis specially constructed for tipping waggon bodies, shown in the accompanying photograph. Raw materials in bulk are conveniently handled by the tip wagon, and coal is only one instance of a material universally used and which can be most suitably handled in this way.

While the heavy lorry has unlimited uses, many of the high costs in connection with transport are the outcome of inefficient organisation. One has only to observe the number of heavy commercial vehicles on the highways carrying half loads to realise this, as these cost as much to run half empty as with their normal load. But it is often impossible to run such vehicles fully loaded, and in consequence there is wastage in these circumstances where such means of transport are used and overheads in the transport department are therefore high.

As a solution to the problem of costly transport, therefore, the 20-25 cwt. commercial vehicle has been designed by A. Harper Sons and Bean, Ltd., 11a, Regent Street, London, and is shown in the adjoining photograph. The Bean commercial vehicle can accommodate its full load of 25 cwts. comfortably, and with such a load its running cost will compare very favourably with that of lower-priced vehicles of nominally one-ton capacity. A particular feature of all Bean commercial models is that "Safety First" front wheel brakes are included in the specification at a small additional cost.

A New Cask Lifting Appliance

ONE of the objects of those responsible for the organisation of modern works should be the elimination of unnecessary manual labour, and a machine lately brought out for the lifting of casks is designed to this end. In oil, fat and soap works, to mention only a few which employ barrels for the containing of their products, the loading of casks on to lorries for transportation is often an unnecessarily costly process, as many as five men sometimes being required to roll heavy barrels up planks, but by the use of a mechanical elevator this can usually be done by two. F. T. Murdoch and Co., of Thompson Street, Belfast, manufacture a patent cask lifter, designed to raise and lower casks by hand power on to the second or third tier on lorries and to tar boilers, chemical vats, etc., at any required height. Further, the machine permits the cask to be turned by hand on the machine's carriage, so as to bring the bung-hole round as required to allow the contents to be emptied, and it is seen in use for this purpose in the accompanying picture. The discharge is as readily interrupted or stopped by turning the barrel in the opposite direction. The use of the machine in this capacity dispenses with the need for one or more men mounting on the top of a boiler or tank to manœuvre the barrel into position for emptying its contents.

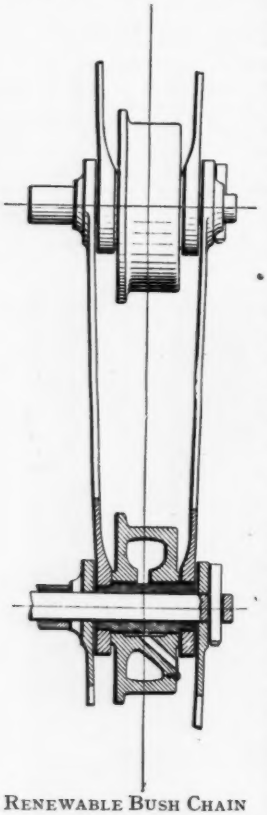


LIFTING A TAR CASK FOR DISCHARGE INTO BOILER

A further application of the machine is for use in warehouses and stores, where it will run along narrow passages between tiers of packages or boxes, and will tier them to any required height. Although a man can deal fairly well with boxes of a good weight, this becomes increasingly difficult when the third tier is reached.

Gravity or Lip-Bucket Conveyors

A FURTHER development in gravity-bucket conveyors, which is designed in particular for use in gas works, has been made by West's Gas Improvement Co., Ltd., of Manchester, who have improved their system of gravity-bucket conveyors by constructing the buckets with lips. The result is that when the buckets are in a straight line they form a continuous trough which facilitates the delivery of the materials to the conveyor, and does not need the type of filler generally used with buckets which have a space between them ; the materials can therefore be delivered to the conveyor from a shoot or other convenient means. The conveyor consists of buckets placed upon an endless chain which, in the case of a Glover-West vertical retort house, passes below or on a level with the floor and receives coke as it is discharged from the retorts, rises vertically, and travels horizontally to a point where the coke is discharged into a screening plant or hopper provided with outlets for filling railway wagons, lorries, or carts. When not conveying coke, the conveyor is employed for carrying coal to overhead storage bunkers above the retort bench. An important feature of these conveyors and elevators is the renewable bush chain, which is said to be well adapted to the conditions prevailing in gas and chemical works, in which long durability service is required and breakdowns have to be avoided at all costs, and where the destructive effect of the materials to be handled is severe.



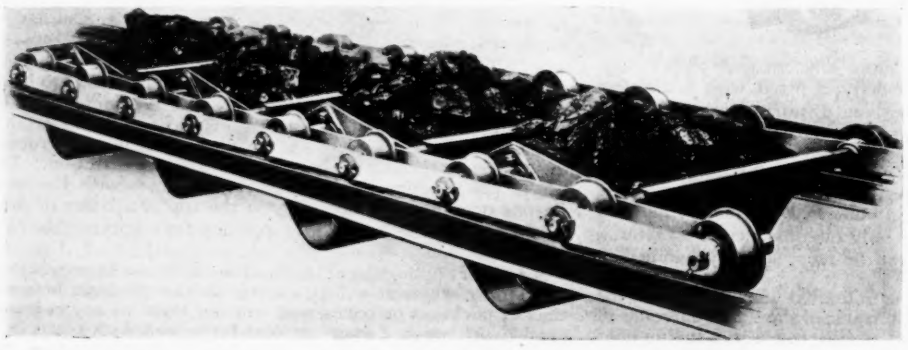
RENEWABLE BUSH CHAIN

The West lip-bucket conveyor consists of two lines of chains, each of which is supported by rollers travelling along parallel tracks, the joint pins being alternately extended to form trunnions for the support of the buckets and cross members to keep the chains in parallel alignment. Each chain consists of two parallel lines of side links in the form of steel drop forgings. The joint is composed of two elements, first, the steel bush which extends through the inner pair of links where they meet, and relative to which it is fixed, and, secondly, the pin extending over the whole width of the double chain and fixed relative to the outer pair of links. This construction is shown in the illustration. The result of it is that the wear and tear of the chain is confined entirely to the pin and the interior of the bush, and takes place only when the chain changes direction. Furthermore, the bearing surface over which the wear is distributed is extended over the full length of the bush. The outside of the bush is machined and provides a journal for the supporting runner wheels, which are constructed in the form of a grease reservoir. The buckets overlap one another so that, when the chain is extended horizontally, they present an unbroken surface for the reception of the materials to be handled. The mechanical filler, which used to be an obstacle to the application of the gravity-bucket conveyor to the handling of friable materials, is unnecessary. The materials are delivered straight to the buckets, where they remain without disturbance until the point of discharge is reached, and this is an obvious advantage for the handling of coke and other friable materials.

Scientific Methods in Rope Driving

THE average chemical works is just as keenly interested in efficient power transmission as any other industrial establishment, and very often the plant is characterised by a number of drives of greatly varying character, many of which are of a difficult nature. In general the advantages of rope driving are perhaps not realised to the fullest extent in the chemical industries. These include noiselessness, safety, convenience, the faculty of being able to divide off definite amounts of power to a number of different driving shafts or single pieces of apparatus, such as rotary driers or grinding mills, for example, and a low cost for long distances from centre to centre. Every method of driving has disadvantages, and as far as the ordinary round cotton rope is concerned it is not very pliable, so that pulleys of a diameter less than 30 times that of the rope cannot be employed, whilst it is affected by an acid atmosphere, and other difficulties are uneven stretching with resultant slip and loss of power, and the necessity of frequent re-splicing, which is costly in labour and loss of time due to stoppages. Particularly interesting, however, is the square-plaited hempen driving rope, which is a production of Sutcliffe Brothers and Bryce, Ltd., of Hyde, near Manchester, and is claimed to eliminate most of the above difficulties. Hemp is, of course, a much superior fibre to cotton for ropes in general and has been used by the human race in this connection for thousands of years, being stronger, more resistant to friction, and not affected to the same extent by moisture, heat, traces of acid, and other deleterious influences. This is naturally of particular interest to the chemical industries, and the resistant nature of hemp is also shown by its universal application for ropes exposed to sea water.

The objection to hemp made up in the form of the ordinary round driving rope is that it gives a rather severe continuous to-and-fro bending action of the hard fibre when going round the pulleys, and the softer and less resistant cotton stands this much better. In the square-plaited hempen rope, however, the action is very largely a sliding of one strand over another, and hemp resists this action without difficulty, the separate strands under the influence of grease and friction giving a highly polished surface, almost metallic in appearance, quite different from a square cotton rope, which is not a success. Further, a square hempen rope will run for years without re-splicing, ten to twelve years being quite common, not only because of the more resistant fibre, but also the absence of the continual untwisting motion characteristic of all round ropes when running. In addition, these square ropes do not stretch because they are put on the pulleys already under a tension equal to that of the actual running conditions, having been stretched whilst in process of manufacture, which is obviously a more scientific practice than merely putting on the ropes loose, as seen by the fact that square hempen ropes always run dead level side by side, without sagging unequally.

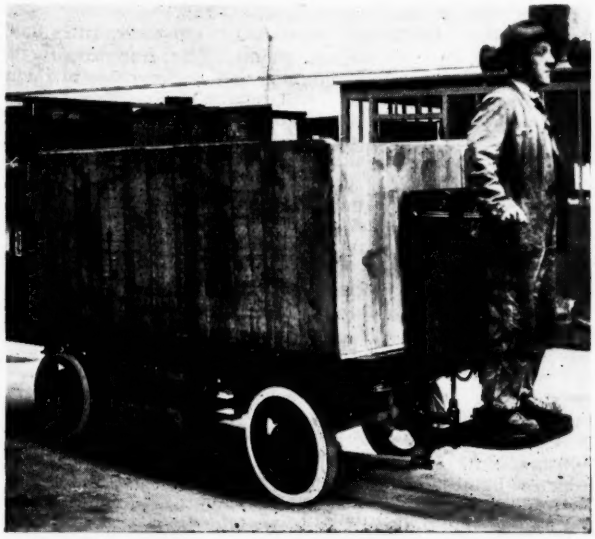


DETAIL OF THE WEST RENEWABLE BUSH CHAIN FOR CONVEYORS AND ELEVATORS

The tensile strength is, of course, considerably greater and, for example, a 1 in. round cotton rope has a strength of 6,400 lb., whereas the square hempen rope is about 12,000 lb., whilst, finally, the latter will run at much higher speeds and operates easily on a pulley 18 times the diameter of the rope, and as low as 12 in an emergency.

Electric Trucks

One important consideration in respect of mechanical handling is the question of noise. In the elimination of this undesirable feature electric trucks and apparatus have many advantages. Apart from runway trolleys, there is now offered an extensive range of trucks for all purposes. British Electric Vehicles, Ltd., of 36 and 37, Old Jewry, London, are specialists in this field, and have supplied trucks to several of the leading chemical and allied concerns. A model particularly suited to heavy work is the " Super-Giant " spring truck, built to carry heavy loads over rough sets. The truck has been described as a miniature motor lorry, and can take a full load up a gradient of 1 in 12. Special low platforms and electrically operated elevating platforms can be incorporated, and all trucks are fitted with steering apparatus to meet particular requirements. Ball or roller bearings throughout



A "Super Giant" Truck mounted on semi-elliptic springs

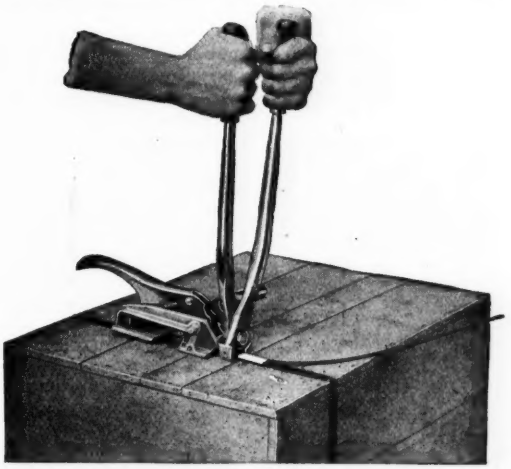
add to efficiency, and bodies can be fitted to suit specific loads. Trolleys can also be fitted for trucks to run from overhead rails, and trailers are provided for.

The products of this firm can claim the added qualification of being " All-British."

Nail-less Strapping for Packing Cases

In the transport of chemicals it is essential that the cases which contain them should be securely sealed to ensure that they will reach their destination intact and that the products will arrive free from contamination of any kind. The ordinary wooden packing case or box is subjected to rough handling in transport and, even when of the best quality, is sometimes liable to become split open. Steel strapping is a device commonly used to reinforce cases in this connection, and the " Signode " nail-less system is an advance on the ordinary methods. The principle of this system is the substitution of the usual nail joint by a metal sleeve which is crimped over the joined ends of the steel band in a special way. Not only is a reduction in the thickness of the case made possible by the consequent absence of nails in this system, but it strengthens the package and seals it against pilferage.

The distinctive feature of the Signode system is, therefore, the special joint, and to eliminate any chance of boxes sealed in this way being opened in transit, the special tools needed to effect this sealing are placed on loan against deposit to their registered clients by Signode, Ltd., Newton Works, Goldsmith Street, London, instead of being sold. It is therefore impossible that cases using these seals can be opened in



transit and the seals replaced, as the tools are registered and in the hands of responsible firms only. To open the case at its destination the band is cut outright in the usual way. The crimped seals can be supplied with the trade mark or name of the firm stamped on them and for this reason are termed Signodes. The steel band is stretched round a box or barrel and clamped with a vice-like tool, and at the same time the special seal is crimped over the joints with another instrument, as seen in the accompanying photograph.

Band Conveyors

Among the advantages which band conveyors have to offer is that they can be erected in almost any position and there is a considerable saving in power over that required for worms for large quantities over long distances. Various descriptions of conveyor including band, pan, scraper, and apron types, are made by J. Harrison Carter, Ltd., of 12, Mark Lane, London.

Bands are made of cotton or rubber in widths from 10 to 20 in., and may be made to work in conjunction with a special travelling throw-off carriage designed by this firm. Short band conveyors can be arranged either to carry the material on the top band or, if fitted with scrapers, to drag it along the bottom of the box or trough.

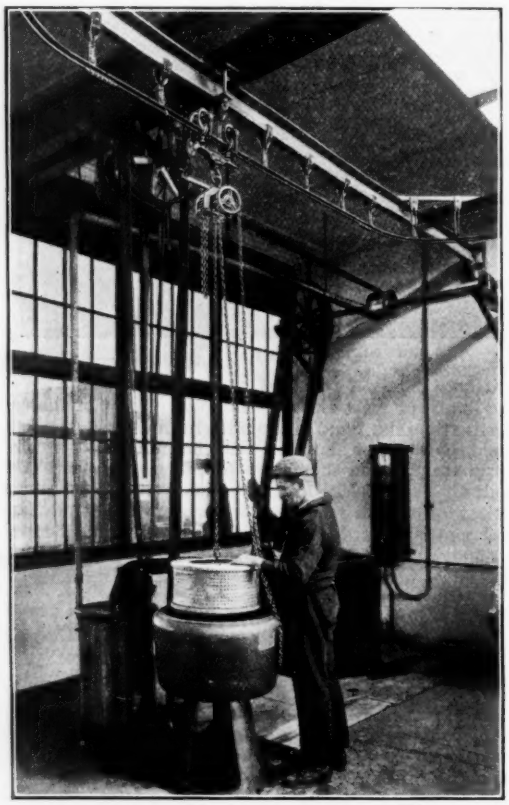
Several kinds of elevators are also made by this firm, and, in the vertical type, when the material to be lifted is in small particles and not of a wearing nature, webbing or leather bands are recommended, while if it is in a rough condition, chain should be used instead of webbing, and malleable iron buckets instead of sheet steel.

Steam Waggons

While the use of motor transport is becoming more general, the reliability of the steam waggon is testified to by the large number of users of this type of vehicle, which combines great power with considerable speed. Since their introduction in 1923 by the Sentinel Waggon Works, Ltd., of Shrewsbury, their " Super-sentinel " steam waggon has been subjected to continuous use under many conditions, and even before this latest undertype model was first put on the market, it is understood that the firm subjected it to tests over a period of years to ensure that the final product should be as reliable as possible. After twenty years of continuous practice in the manufacture of steam waggons, it is not unnatural that the " Sentinel " should be widely used, and among the models is a three-way-power-operated tip waggon, which should have many applications in the handling of raw materials in chemical works practice.

Economical Runways

THERE are few firms handling produce in bulk who can afford to overlook the advantages of runways. Overhead runways leave the floor clear, speed up transport, and are unaffected by fixtures that would impede ground traffic. A firm which produces runways to meet every individual requirement is Herbert Morris, Ltd., of Loughborough. Roller bearings facilitate quick transport, and the risk of expensive collisions is avoided. Branch lines or extensions can be added to existing



BRINGING A LOAD TO A CENTRIFUGAL DRIER

runways with the minimum of trouble and expense, and it is the firm's claim that no special skill is required to lay their latest overhead runways; any practical man with a few simple tools can do it. Special slings, trolleys, and clamps are manufactured to suit all types of loads, and these runways have already proved most effective in the chemical industry.

The fittings of these runways are designed to bring inter-department and works communication to the highest level of efficiency. Two- and three-way switches, turntables, and crossing tables are available, and the firm make lifting gear, grabs, and electric lifting apparatus for all plant. Endless conveyor bands, hoists, trolleys, lifts, shoots, and works trains are included in the manufactures, and it is safe to say that there is not a case of works transport or handling that cannot be dealt with expeditiously and economically by Morris machinery.

Uses of Rubber

THE Rubber Growers' Association have issued an interesting pamphlet, "Some Home, Outdoor, and General Uses of Rubber," in which the history of the industry is shortly reviewed, the various processes described by which the raw material is converted into the finished article, and a list given showing the surprising variety of industrial, domestic, and general uses to which rubber is now put. The volume is well illustrated and gives the reader a good popular idea of this rapidly developing industry.

British Association at Southampton

Professor H. Lamb on the Aims of Science

THE annual meeting of the British Association for the Advancement of Science opened at the Central Hall, Southampton, on Wednesday evening. About 1,700 members are taking part in the proceedings.

Professor Lamb dealt with the nature and purpose of science. He summed the aim of science in the sentence "to subdue the forces of Nature to the service of man." Such were the unknown possibilities of science that even the more speculative branches of science should not only be tolerated but encouraged, as ancillary to the supreme end. The primary aim of science was to explore the facts of Nature, to ascertain their mutual relations, and to arrange them as far as possible into a consistent and intelligible scheme. That endeavour was the true inspiration of scientific work, as success in it was the appropriate reward. The material effects come later, if at all, and often by a very indirect path. He referred to the National Physical Laboratory as becoming a great institute of theoretical and applied science, informed by the true spirit of research.

Ecclesiastical authority and science were, he said, at one time in conflict over matters entirely within the province of the latter, but there was a disposition on either side to respect each other's territories. To-day, opposition and dislike was political rather than ecclesiastical. Talk was sometimes heard of the "bankruptcy of science," but such critics had been misled by extravagant claims. The true leaders of science were always most guarded and conservative in their forecasts. In spite of all criticisms, said Professor Lamb, they might truly claim that their efforts had their place, not a mean one, in human activities and tended to increase the intellectual, material and even æsthetic possessions of the world.

Professor Lamb then dealt at length with various branches of geophysics, particularly relating to the constitution of the earth. He concluded by appealing for interaction between the various branches of science and referred to the contemplated developments of the University College at Southampton.

A New "Proofing" Process

Important Properties Claimed for New Product

A NEW process for proofing textiles and other materials is reported to have been discovered by a London chemist, Mr. E. Cook. According to the inventor, the process "deprives substances of their natural affinity for moisture." It is claimed that the lightest materials, when treated by the process, can be immersed in water without affecting their condition and the thinnest fabrics will hold water after treatment.

Apart from fabrics, the process will proof such articles as needles or other metals similarly susceptible to moisture. The needles can be treated without removing them from the packets, and it is claimed that if a large quantity of needles are subjected to the process, the packets and all coverings, together with paint, ink, etc., are rendered waterproof. Another important property claimed is that the process will allow the "proofing" of powders. For instance, in litho printing the pigment is mixed with oil and spread thinly over the stone. This colour is deliquescent, and a blurring occasionally occurs, known technically as "bleeding," which results in inefficient printing. The new process, it is said, enables the pigment to be treated to eliminate its deliquescent properties before application.

Chemistry at the Polytechnic

THE Polytechnic, 307-311, Regent Street, London, has issued advance details of its winter programmes. The Day Department of the School of Chemistry will cover the general field of chemistry, and in the Evening Department special courses have been arranged. These include: "Gas Engineering and Manufacture"; "The Technology and Chemistry of Fixed Oils, Fats and Waxes," "The Manufacture of Painters' Oils, Colours, and Varnishes" and "The Distillation of Coal Tar and Crude Intermediate Products." The session commences on September 28, and full details of all classes and fees can be obtained on application to Major T. Worswick, at the Education Department of the Polytechnic.

Modern Developments in Paint Manufacture.—(II.)

By J. Gauld Bearn, M.Sc., A.I.C., F.C.S.

We give below the concluding portion of the author's review of recent developments in the paint and varnish industry.

Oil and Oil Varnish Mediums

Tung Oil.—The medium commonly used in the manufacture of paints for ordinary commercial purposes consists generally of a mixture of raw and boiled linseed oil together with a suitable proportion of volatile thinners such as turpentine, with a small quantity of driers. During the last few years, however, a large amount of work has been done in investigating the properties of various oils and oil varnish mixtures with the object of determining their suitability as paint mediums. The result of these investigations has been very encouraging, and many new mediums have been discovered having properties of durability, non-permeability, and elasticity far in excess of those found with the ordinary linseed oil mixtures. Perhaps the most interesting and useful of these new mediums are those that have been obtained from the research work done on China wood oil or Tung oil. Tung oil is composed mainly of the glycerides of elæomargaric and oleic acids, and differs essentially in its constitution from linseed oil, which, according to Fahrion, has approximately the following composition :—

Unsaponifiable matter	0·6 per cent.
Saturated organic acids	9·3 ,, ,,
Oleic acids	17·5 ,, ,,
Linolic acid	30·0 ,, ,,
Linolenic acid	38·0 ,, ,,
Glyceryl radicle	4·6 ,, ,,
	100·0 ,, ,,

Tung oil on drying gives an opaque and wax-like film due to the transformation of its characteristic and preponderant constituent elæomargarin into its stereoisomer-elæostearin. The films thus obtained are remarkable on account of their extreme hardness and water resisting properties. When Tung oil is heated up to a tempertaure of 260° C. it rapidly polymerises, and is converted into a tough insoluble jelly-like mass. This peculiar property is characteristic of this oil, and is used as a method for determining its purity.

Ester Gum Paint Mediums.—Ordinary rosin or colophony, which is composed mainly of abietic acid, is of a soft friable nature, and varnishes made with it by dissolving it in linseed oil and turpentine give soft, brittle films which rapidly decompose, and turn white when subjected to weathering influences. It has, however, been found that if this body is esterified by heating it up with glycerine in the presence of dehydrating agents such as lime, the neutral ester gum thus obtained is capable of withstanding the effects of moisture and atmospheric conditions to a remarkable degree. Moreover, if these ester gums are heated up to a temperature of 260° C. with tung oil and a small proportion of a drying agent such as cobalt acetate, the polymerised wood oil and rosin glyceride combine to form a hard gum-like mass which, when thinned down with turpentine, white spirit or other suitable solvents, produce a varnish which is of immense value as a medium for incorporating with pigments. These ester gum wood oil varnishes are now extensively employed as grinding mediums in the manufacture of paints and enamels, and have been found to give extraordinary valuable results in prolonging the life and anti-corrosive properties of paints used for protective purposes on outside surfaces. Paint mediums made by mixing stand oils and blown oils with the usual raw and boiled linseed oil vehicles commonly used have of recent years come more and more into favour, as their excellent properties for imparting gloss and increasing the life of the paint in which they are used have become known.

Lumbang Oil.—This oil, which closely resembles tung oil in its appearance, has been used to a limited extent in the U.S.A. as a paint vehicle, and its properties are now being investigated in this country in order to determine its suitability for this purpose.

Soya Bean Oil.—This oil, which is expressed from a bean taken from a plant grown extensively in Manchuria, has been utilised of recent years, when the price was in its favour as a substitute for linseed oil. A quantity up to 25 per cent. may be added to ordinary linseed oil without affecting the drying properties of the latter to any appreciable extent. Boiled oil vehicles made with soya bean oil require an additional amount of driers as compared with linseed oil, otherwise the paint films obtained on drying would be too soft to be serviceable under ordinary exposure conditions. Passing reference might perhaps also be made to such oils as Perilla oil, Candlenut oil and refined Menhaden oil, all of which have been used to a limited extent in recent years as paint oils.

Celluloid and Nitrocellulose Mediums

During the war a very large demand sprang up for pigmented protective coatings made either on nitrocellulose or celluloid mediums for use on doped fabric. These protective coatings were not only valuable on account of their quick drying properties, but also because of the elasticity, durability, and non-permeability of the paint film they gave on drying. Since the war the properties and applications of these mediums for use in quick drying paints and enamels have been the subject of very much patient investigation, and as a result a considerable industry has sprung up in the manufacture of these products as substitutes for the slower drying oil and oil varnish paints and enamels. The method in general use at the present time for the production of these paint mediums is briefly as follows :—The celluloid or nitrocellulose is pugged up in a machine with amyl or butyl acetate till the whole mass has gone into solution, giving a clear, thick pasty syrup. This syrup is then thinned down to a suitable varnish consistency in a mixing machine with a mixture of acetone alcohol and benzol. The varnish thus obtained is incorporated with various pure pigments such as zinc oxide, carbon black, yellow ochre, etc., according to the colour of the paint which is required. The pigments used must have previously been ground to as fine a degree as possible by mixing them with castor oil or triacetin and passing them four or five times through triple steel roller mills. The function of the triacetin or castor oil is to act as a softening agent in order to impart toughness and elasticity to the dried paint films, which otherwise would tend to be brittle. Various types of other softening agents are also employed, such as benzyl alcohol, Venice turpentine, and various soft gums too numerous to mention, according to the particular purpose for which the paint is intended.

Nitrocellulose and celluloid paints are usually applied by the spraying process. From the beautiful finish which can be obtained by their aid there is little doubt they have a great future before them. Even now they are extensively used as protective and ornamental coating on metal and other surfaces, and on account of their quick drying properties and the beauty and hardness of their finish they are rapidly superseding the slow drying stoving enamels.

Cellulose Acetate Mediums.—Cellulose acetate, unlike nitrocellulose and celluloid, is non-inflammable, and for this reason is highly valuable ; it has been used as a medium for paints, but its comparatively high cost precludes its use except for special purposes. At the present time it is employed chiefly in the manufacture of dope, which is made by dissolving the cellulose acetate in a mixture of acetone alcohol and benzol, a small proportion of benzyl alcohol or triacetin being added as a softening agent. Quite recently pigmented dopes have been introduced, and are now extensively used in the place of ordinary dopes. Pigmented dopes are made by mixing a small proportion of pigments, ground in benzyl alcohol or other softening agent, with ordinary dope. The addition of pigments serves to prolong the life of the dope when subjected to exposure by shutting out the actinic rays, and thus obviates the necessity of applying a coating of pigmented varnish, which otherwise would be imperative when ordinary dope is used.

Rubber Latex Mediums.—Rubber latex is the milky juice of various trees which are natives of tropical countries such as Borneo, Sumatra, Brazil, Malay Peninsula, etc. It has during the last few years been imported into this country and America, and a considerable amount of experimental

work has been carried out with a view to its use as a medium in the manufacture of paint. As imported, rubber latex always contains a certain proportion of ammonia, which has been added to prevent the rubber from coagulating and being thrown out of solution.

In this country up to the present time very little of this material has been used in the paint industry, but investigations are still going on which will undoubtedly result in the near future of its use becoming as general as it now is in the U.S.A. The American paint manufacturers have recently found this substance to be a valuable adjunct to their alkaline casein solutions which they use so largely in the preparation of washable distempers and cold water paints. In combination with casein, dextrin, etc., it has also been found very useful as a priming or first coating on walls for preventing suction, and thus enabling subsequent coats of paint to be applied without any fear of their peeling off from penetration of moisture.

Shellac Goldsize Mediums.—Goldsize varnishes were formerly very extensively used as the medium in which various pigments were ground to a stiff paste form for the production of coach colours. Goldsize varnish is usually a hard-drying varnish made from kauri gum, and should dry off in three or four hours. In recent years it has been successfully replaced by extra quick drying mediums known as shellac goldsize, possessing the property of drying off hard in less than an hour. The latter were introduced into this country from America, and are made by melting various proportions of shellac—either natural or synthetic—in hot linseed oil, and cooking the mass with a large amount of driers till all the shellac has gone into solution. The hot thick mass is then thinned down to a thin consistency with turpentine, and is used as a grinding varnish in the preparation of goldsize colours. These shellac mediums constitute a notable advance on the ordinary goldsize by reason of their excellent binding and quick-drying properties.

Synthetic Resin Mediums.—The introduction of various types of synthetic resin of definite composition on the market during the last few years has been of very great importance to the paint industry, inasmuch as the limited supply of the hard fossil resins, particularly kauri, is a serious matter for the future of the industry. The earliest and best-known of these synthetic resins is Bakelite, which is prepared by the interaction of phenol and formaldehyde. When dissolved, this product gives films which, on drying at a moderately low temperature, are remarkable for their hardness and resistance to alkalies and other chemical agents. Since the introduction of Bakelite a vast amount of research work has been carried on not only in this country but also in Germany and America, and many patents have been taken out for the production of synthetic resins of the phenol-aldehyde condensation and of the cumarone type. There is little doubt in the very near future that they will be largely used for the preparation of mediums for use in the paint industries.

Cumarone Resin.—This resin is obtained by the polymerisation of cumarone and indene contained in solvent naphtha or crude coal tar naphtha. These bodies occur chiefly in that fraction which distils over between 160–180° C. The method in use for the commercial production of this resin, according to Louis Rabinowitz (U.S. patent No. 1,416,062), is briefly as follows:

1,000 parts of solvent naphtha are treated with 10 parts of 66° Be. sulphuric acid, the acid being run in in a thin stream with constant agitation. The reaction or polymerisation takes place fairly rapidly, and after the duration of about one hour is finished. In place of sulphuric acid other polymerising agents such as aluminium chloride may be utilised, but as a general rule sulphuric acid is used. When the reaction is over, the naptha is well washed with alkali to remove all free acid, the mixture is then allowed to settle, and the solution of alkali run off. The solvent naphtha is next distilled over with superheated steam, leaving a thick viscous resinous mass. The crude cumarone resin thus obtained is then hardened by distillation in vacuo at a temperature not exceeding 200° C., since at a higher temperature decomposition may occur. It is soluble in a variety of solvents; and these solutions lend themselves admirably as paint mediums. The colour of the resin varies from a pale straw to a deep brown, according to the temperature to which it has been subjected during the distillation process.

Solvents and Diluents

The most important solvent at the disposal of the paint manufacturer is undoubtedly spirits of turpentine, or as it is commonly called "turps." This product is an essential oil, a hydrocarbon, the most important ingredient of which is pinene $C_{10}H_{16}$. The major portion of the American turpentine which comes on to the market is obtained by the distillation of a concrete oleo-resin which exudes from the southern long leaf yellow pine (*pinus palustris*). Small quantities of turpentine are also obtained from France, Spain, and Portugal. The rapid depletion of the turpentine forests, and the consequent high price of turpentine, has resulted in the paint industry seeking substitutes for this product. A brief description of some of the more important of these substitutes will now be given.

American Wood Turpentine.—During the last few years the American producers of turpentine have turned their attention to the manufacture of turpentine from the resinous wood of pine trees. This product is known as "wood turpentine," and is obtained mainly by the steam distillation of the chipped stumps and mill waste of pine trees. So greatly have the methods of production improved of recent years that the material now sold comes within the accepted chemical and physical limits of gum turpentine. Owing to its lower price it is now largely used instead of ordinary turpentine. Wood turpentine may be readily detected from the genuine article by its characteristic smell. As regards its solvent power, rate of drying, and oxidising properties there is little to choose between them.

Russian Turpentine (Swedish Turpentine, Finnish Turpentine.)—This product is imported from Russia, Sweden, and other parts of northern Europe, and is obtained by the distillation of the wood from the Norwegian pine (*Pinus Silvestris*). Its use as a solvent in the paint trade has not been adopted to any great extent owing to its rank and unpleasant smell. Various methods—many of which have been patented—have been tried for the deodorisation of this solvent, but none of these has been very successful. Nevertheless, at the present time a considerable amount of this sweetened material is employed in the industry on account of its comparatively low price.

White Spirit, Mineral Turpentine.—The chief substitute for turpentine is white spirit, which is obtained by the distillation of kerosene. Numerous grades are put on the market, varying considerably as regards their gravity, flash point and distillation figures. New methods adopted for the refining of the crude products have resulted in recent years in the introduction of sweet smelling spirits which, for all practical purposes, are equal as diluent to American turpentine, and cost only about one-fifth of the latter. Immense quantities of this material are now used in the paint industries as a thinning agent in order to reduce paints to a suitable working consistency, and the time is not far distant when this product will entirely supersede American spirits of turpentine for this purpose.

The following table shows the constants obtained for American turpentine, a standard grade of white spirit, and varying mixtures of these two bodies, and is interesting as showing the effect which the addition of white spirit has on the distillation figures of American turpentine.

	A. Grade 1 White Spirit.	B. A+25% American Turpentine.	C. A+50% American Turpentine	D. A+75% American Turpentine	Genuine American Turpentine
Specific Gravity at 15·5° C.	0·800	0·816	0·832	0·848	0·864
Flash Point (Close Test) ..	81° F.	82° F.	84° F.	87° F.	94° F.
Boiling Point ..	147° C.	147° C.	147° C.	147° C.	156° C.
150° C. ..	3 %	3 %	3 %	3 %	—
160° C. ..	32 %	24 %	22 %	28 %	75 %
170° C. ..	44 %	66 %	78 %	89 %	98 %
180° C. ..	76 %	85 %	90 %	94 %	99 %
190° C. ..	89 %	92 %	94 %	97 %	Dry
200° C. ..	94 %	97 %	98 %	98 %	—
210° C. ..	99 %	99 %	99 %	99 %	—
215° C. ..	99·5 %	100 %	100 %	100 %	—
200° C. ..	Dry	—	—	—	—

Non-Inflammable Solvents

During the last twelve years, various chlorine derivatives of ethane and ethylene have been manufactured on a commercial scale for use as solvents and extracting agents. The general characteristics of these chlorine derivatives are that they are colourless liquids, heavier than water, and have a pungent and rather offensive smell. They are chiefly valuable because of their non-inflammable and excellent solvent qualities. On account, however, of their toxic properties, they have only been used to a limited extent in the paint industry. One of the most important of this group is tetrachlorethane, which was formerly largely used as a solvent for cellulose acetate in the manufacture of dope, and gave most excellent results. Its use, however, for this purpose was abandoned during the war owing to its poisonous effects. The following is a list of the chlorine derivatives of ethane and ethylene with their specific gravities and boiling points, which are now manufactured on a commercial scale for use as solvents and extracting agents.

	Specific Gravity.	Boiling Point.
Dichlorethylene $C_2H_2Cl_2$ ..	1·25	55° C.
Trichlorethylene C_2HCl_3 ..	1·47	87° C.
Perchlorethylene C_2Cl_4	1·62	121° C.
Tetrachlorethane $C_2H_2Cl_4$ ..	1·60	147° C.
Pentachlorethane C_2HCl_5 ..	1·70	159° C.

Tetralin and Dekalin.—These two new solvents have quite recently been placed on the market in this country for use in the paint and varnish trades. Their manufacture was started in Germany on a very large scale during the war for use as solvents to replace turpentine and white spirit. They are obtained by the hydrogenation of napthalene in the presence of a catalyst such as finely divided nickel or copper oxide. The following table gives the physical properties of these two solvents as compared with turpentine and white spirit.

	Boiling Point	Flash Point.	Specific Gravity.
Tetralin ..	205° C.	172° F.	0·980
Dekalin ..	190° C.	135° F.	0·890
Turpentine ..	156° C.	94° F.	0·864
White Spirit ..	147° C.	80° F.	0·800

Both tetralin and dekalin are excellent solvents, the former having the greater solvent power of the two. As their price is about half-way between turpentine and white spirit, there would appear to be a considerable future for these products as solvents.

The chief objection to their use as a substitute for turpentine in the manufacture of paint is the very unpleasant smell they emit, which renders them unfit for general use as solvents until means can be discovered for masking their odour.

Driers or Siccatives

Various salts and oxides of certain metals such as lead manganese and cobalt are extensively employed as drying agents in the paint industry. A large amount of work has been undertaken in recent years in order to determine the most suitable combinations of the various metallic salts for promoting in the most efficient manner the drying of paint films. A brief description of some of the more important of these drying agents, together with an account of their properties and general method of preparation, will be of interest.

Cobalt Linoleate.—This body is one of the most successful of the more recently introduced driers, and is used in very large quantities as a drier for paint mediums. It is placed on the market in two forms, *viz.* :

Cobalt Linoleate Paste ..	6 per cent. Co.
Cobalt Linoleate Liquid ..	4 per cent. Co.

and is prepared in the following manner. Raw linseed oil is boiled with the requisite amount of caustic soda solution till it is completely saponified. A solution of cobalt acetate or chloride (24–25 per cent. Co) is then run in till all the soap solution has been precipitated as cobalt linoleate. The precipitated cobalt linoleate thus produced is well washed to free it from all soluble matter, and then dried at a low temperature. This material is of a dark reddish colour, and readily soluble in hot oils or turpentine. It is one of the most powerful drying agents known, and only a very small amount is necessary as compared with other drying salts, less than ¼ per cent. being sufficient to convert raw linseed oil into a boiled oil when heated up with it to 300° F. Cobalt linoleate has been very successfully used of late years as a drier for white paints on account of its non-darkening properties, any slight discoloration that may be caused by its use being rapidly bleached out on exposure to light.

Lead and Manganese Tungates.—Driers made from tung oil are now extensively used for hardening paint films, and for this purpose are far superior to many of the driers made on a linseed oil basis. These salts may be made either by a precipitation process, as described under cobalt linoleate, or else by fusion. In the latter process, the acetates of lead and manganese in the proportion of approximately 7 parts of lead to 1 of manganese, are cooked up with wood oil to a temperature of 200° C. and kept at this temperature till all taken up. The fused mass is then thinned down to a thin varnish consistency with mineral turpentine.

Vanadium Driers.—Quite recently it has been proposed in the U.S.A. to use various salts of vanadium as paint driers. There is, however, little likelihood of their general adoption, not only on account of their high price, but also because of the fact that they tend to darken the medium with which they are used to a much greater extent than cobalt. Further, they are not comparable with the latter as regards drying efficiency.

U.S. Chemical Exports Increasing

THE foreign trade of the United States in chemicals and allied products during the first half of 1925 was larger than in the corresponding period of 1924. The aggregate value of exports rose 11 per cent. to $74,678,000, and imports 15 per cent. to $113,552,000 for the period January to June of this year, according to the Chemical Division of the Department of Commerce. Gains were made in exports of ammonia and ammonium compounds, aluminium sulphate, bleaching powder and copper sulphate, while losses occurred in acetate of lime, calcium carbide, glycerin, and potassium bichromate. Demand for formaldehyde remained about the same, although the value fell off a little due to drop in price. Sodas likewise recorded greater quantities shipped but lesser value. A sharp decline was registered in exports of methanol, only 251,000 gallons, valued at $219,000 having been shipped abroad during the first six months of the current year. Of the more important chemicals imported probably the largest advance was made in crude potassium bitartrate, when 10,332,000 pounds, valued at $725,000 were received during the current six months. In contrast to the exports, receipts of both calcium carbide and glycerin improved. Incoming shipments of citrate of lime were also a little below those of the corresponding period of 1924.

In the first six months of this year imports of coal tar products were double export figures. Benzol exports were halved, but dye figures increased by 37 per cent.

New Name Wanted for Artificial Silk

LECTURING before the Drapers' Summer School at Oxford on "Artificial Silk," Mr. J. E. Featherstone said that if a sufficient supply of raw silk could be produced to bring silk garment fabrics directly into competition with their baser cloths, the latter would rapidly lose most of their popularity. The supply of silk, however, could obviously be increased but slowly, and the question of providing an imitation if not a substitute for silk had attracted considerably more attention during the last 100 years than had that of stimulating the production of real silk. The artificial silks of commerce all had cellulose, derived either from cotton or from wood, as their basis. Viscose was the most important of artificial silks at present. The extent of the industry was widening every week. During the last few years the output of the world had been practically doubled. The present production was almost double that of real silk, and the supply was not yet equal to demand. In England about 15 factories were already in existence for the production of artificial silk, and this number would probably be more than doubled in the course of the next few years. Speaking generally, artificial silk was no more a substitute for real silk than was mohair. It was a new fibre, and deserved a new name totally dissociated from that of silk.

German Aluminium Syndicate

IT is reported that negotiations have been concluded by German aluminium rolling works with a view to establishing a syndicate which shall regulate the production and sale of aluminium sheets. A syndicate agreement has already been drawn up and agreed upon in its main points by the works participating. On the other hand, no details have so far been reported in regard to the participation quotas to be allotted to the various works in regard to output and sales.

New Legislation on Fertilisers and Feeding Stuffs

Report of the Advisory Committee

The report of the Fertilisers and Feeding Stuffs Advisory Committee, appointed by the Minister of Agriculture and Fisheries (H.M. Stationery Office, 36 pp., 9d.), contains detailed schedules of articles to which the proposed new Act should apply wholly or partly, definitions of meanings of terms, deleterious ingredients, and worthless ingredients. In addition, the views of the committee on various points are explained in notes, from which the following extracts are taken.

In many ways the particulars which will, if our suggestions are accepted, be required to be given on sales of fertilisers and feeding stuffs will be of more value and assistance to purchasers of these commodities than are the particulars required to be given by the present Act. On the other hand, there are cases in which we have been obliged to seek compromises, and it is to be expected that our proposals in these respects will fall a little short of the desires of one class or exceed those of another. In some such instances, owing to the imperfect condition of our present knowledge, we have hesitated to make definite recommendations, even though we felt that something more than will be found in the Schedules may be desirable. We are, accordingly, taking advantage of the proposal, which was made in the Report of the Departmental Committee of 1923-24 and to which effect will presumably be given in the proposed Bill, that a permanent Advisory Committee should be set up at a later stage, and are suggesting that certain matters should be left for further consideration, at a convenient time, by the proposed permanent Advisory body.

Warranties

A number of articles, used in varying quantities as fertilisers and feeding stuffs, have been left out of the Schedules. In the case of these substances, most of which are waste substances from other manufactures, we do not think it necessary to compel sellers to give warranties of the percentages of valuable ingredients; but we suggest that provision should be made in the Bill that, if statements as to the percentages of constituents are made, they should have effect as warranties. If this is accepted we think that, as a corollary, local authorities should be empowered to allow purchasers of such articles, in cases where a warranty has been given on sale, to have samples analysed, on payment of a fee to be fixed by the local authority, provided that the samples are taken in the prescribed manner. It should, we think, further be required that any warranty given by a seller otherwise than under the requirements of the proposed Act should be given only in terms of the prescribed method where such prescribed method has been laid down.

Basic Slag

A great deal of discussion has taken place around the question of the desirability of requiring, in the case of basic slag, a statement of the percentage of phosphoric acid soluble in a prescribed solution of citric acid. At one end of the scale there is a very strong feeling that the efficacy of basic slag depends mainly upon a large percentage of the phosphate present being soluble in a weak citric acid solution and that a statement of the percentage of citric soluble phosphoric acid should, therefore, be demanded. At the other end is the opinion that there is no scientific basis for the belief that citric solubility tests offer any appreciable assistance in determining the value of basic slag.

In this connection we understand that a number of experiments have been and are being carried out at Rothamsted on basic slags of varying solubility, as ascertained by the present official method, the results of which appear to indicate that solubility in citric acid by the official method does not prove altogether trustworthy as a guide to their fertilising value. In between the two extremes is the view that the present provisions, which permit of a statement of citric solubility but do not make it compulsory, afford all that is needed and should remain substantially unchanged. Certainly, it seems to us that if that position can be maintained, and the practice of giving a statement of citric solubility can be encouraged, those who attach importance to it will be in a position to obtain satisfaction, while nobody will suffer injury.

In face of the evidence, or rather in default of sufficient evidence of a positive character, we are not able to recommend at the moment that a statement of the citric soluble phosphoric acid should be made compulsory in the case of basic slag, and in consequence we have not included such a requirement in the First Schedule. The adoption of the Schedule as drafted will not, of course, prevent sellers from giving a statement of citric solubility, and we have no doubt that those farmers who place some value on this information will have little difficulty in obtaining it. Nevertheless, we recognise that the position which exists to-day is liable to change materially at any time, and we recommend that the permanent Advisory Committee, when constituted, should bear this matter in mind with a view to the amendment of the Schedule if and when a more satisfactory means of evaluating basic slag than the present "citric solubility" method is evolved.

Compound Fertilisers

Another matter that has been the subject of much consideration is the nature of the "particulars to be prescribed in the case of compound fertilisers, particularly with regard to the nitrogen content. It is possible, in the manufacture of compound fertilisers, to use one or more of a large number of nitrogenous substances of different origin, but we are advised that it is not always possible to check by analytical methods any statement as to the origin of such substances. In addition, the unit values of these substances vary widely, because the nitrogen of some is more readily available to the plant than that of others. It was suggested that the difficulty might be met by requiring separate statements of the water soluble and the water insoluble nitrogen, but, on further examination, this was found to be impracticable because of the possibility of change, in some cases, from insoluble to soluble form, and also because, if the method were adopted, the nitrogen from dried blood, for example, would be classed as "insoluble" (with its implication of inferiority), although this substance is a valuable constituent of compound fertilisers. In this case also, therefore, we recommend that the matter should be brought specially to the notice of the permanent Advisory Committee, when constituted, in order that they may give early consideration to the question of classifying nitrogenous substances.

In the case of potash in compound fertilisers, we have come to the conclusion that it will be sufficient if an "acid soluble" method of analysis is provided for determining the amount of potash present.

The suggestion was made that it would be of advantage to farmers to be informed of the percentage of chlorine or, preferably, of chlorides contained in compound fertilisers. The whole object of the desire of the farmers to know the percentage of chlorides present is, however, to learn whether the potash contained in the compound fertiliser is derived from sulphate or muriate of potash, and this an analyst could not always state definitely. In the circumstances, therefore, we have, as a Committee, agreed that it would not be desirable to require a statement of the percentage of chlorine.

Fish Meal

While it is not suggested that the oil in fish meal is detrimental to stock in the sense that an overdose is likely to prove fatal, it is the case that bacon and eggs have been found to have a fishy taint after the pigs and poultry have been fed with fish meal. This has, not unnaturally, given rise to a feeling among certain pig and poultry keepers and some of their advisers that a limitation ought to be placed upon the percentage of oil in fish meal sold for feeding purposes.

On the other hand, it is obvious that, however high the oil content of a parcel of fish meal may be, the user is able to limit the actual quantity of fish oil fed to his stock per diem by reducing the ration of fish meal; and, conversely, if a maximum percentage of oil in fish meal were fixed, it would still be possible for farmers to give larger rations to their stock than they ought, and so for the fishy taint to be transmitted to such produce as bacon and eggs.

There is no doubt that this possibility of tainting will be reduced if farmers are informed of the percentage of oil in each consignment purchased, but we doubt whether it can be altogether removed by legislation. It is only to be expected of the uninformed user that if he finds his pigs or his poultry are doing

well on a small quantity of fish meal, he would be inclined to increase the ration ; and this would be equally the case whether the oil were low or high. There seems to be only one meth od of dealing with the difficulty and that is by educating the farmer in the proper use of fish meal.

It has been suggested that steps should be taken to render illegal the sale for feeding purposes of fish meal containing more than, say, 6 per cent. of oil, but we feel that that would be too drastic a course, seeing that fish meal of high oil content is now used, without disadvantage, for certain specific purposes.

We are, nevertheless, agreed that some additional form of protection is needed, and we have discussed at great length the desirability of including in the definition of " fish meal " maximum limits for both oil and salt, so as to make it an offence to sell under that name a substance which contains oil in excess of the percentage set out in the definition. We doubt, however, the advisability of defining in so arbitrary a manner a term which is already in general use and which has, at present, a wider meaning ; and, apart from this, the fixing of a maximum percentage of oil in substance sold as " fish meal " would probably mean either that the preparations containing more than the limit of oil would be sold under other names, such as " fish protein " (thus destroying the effect of defining " fish meal ") or, alternatively, that the substances containing a slight excess of oil would be exported and lost to British agriculture.

These objections do not hold if " white fish meal " is the substance which is defined so as to provide that the oil content must not exceed a stated percentage. It is already generally recognised in the trade that white fish meal should contain not more than from 4 per cent. to 6 per cent. of oil, and if that trade definition were given statutory sanction it would still be open to manufacturers of inferior kinds of fish meal to sell them as " fish meal " or " fish residue meal."

From the purchaser's point of view, the one essential seems to be that there should be some kind of fish meal, bearing a familiar name and having a wide market, which he can buy without worrying about the precise oil content, but with the assurance that it is not above a certain specified limit. It is probably better, however, even from this standpoint that the term "white fish meal" should be used in this connection, since it is already regarded as a name denoting an article containing a relatively low percentage of oil.

In the end, therefore, we have decided to give a general definition to " fish meal " or " fish residue meal," and a more particular one, including maximum limits for oil and salt, to " white fish meal " ; but it will be seen that, in every case, the seller will be required to state the percentage of oil and salt as well as those of protein and phosphoric acid.

Quick Lime, Slaked Lime, Limestone and Chalk

Our recommendation that the different forms of lime and limestone should be placed in the Second Schedule is a conditional one. If the particulars prescribed in these cases can be obtained without appreciable increase in cost and without a diminution of supply, it will be of advantage to the farmer to have them. We have been reminded, however, that liming has not been carried out in recent years to the extent that is desirable, because of the cost involved, and that the Ministry is endeavouring to encourage the supply and use of the material. If the requirement of a warranty of the nature we suggest is likely to prevent the opening or reopening of pits, or to restrict the output of the smaller undertakings in rural places, it would undoubtedly be preferable to omit lime and limestone from the Schedules for the present.

It has been urged from one quarter that the definitions of limestone and chalk should be framed so as to limit the percentage of magnesia permissible in substances sold for agricultural purposes under those names. We are not satisfied that the presence of a moderate percentage of magnesia, at all events, is harmful to the soil ; but, in any case, if the prescribed particulars which we recommend in the case of lime and limestone are given, a purchaser will have sufficient notification of the purity or otherwise of the substance supplied to him.

Limitation of the percentage of magnesia permissible would tend to deprive some farmers (*i.e.*, those in districts where the indigenous limestone has a substantial magnesia content) of their local supply and to make them dependent on imports from other districts, obviously at an increased price. If farmers find it cheaper, but still satisfactory, to use lime which they know to be of low quality, we see no reason why they should not do so.

An alternative to the limitation of the percentage of magnesia allowed in lime sold for agricultural purposes would be to require that the percentage of magnesia should be stated in respect of every consignment. There is, it appears, nothing actually to prevent this being done, but we are of opinion that the additional cost which would be imposed on lime producers and would, of course, be transferred to the farmers, would be greater than the information was worth to them.

Nitrogen and "Phosphates"

The requirement of existing legislation is, in the case of fertilisers, that the percentages of nitrogen, phosphates and potash shall be stated in terms of nitrogen, tri-calcium phosphate ($Ca_3P_2O_8$) and potassium oxide (K_2O), respectively. There is a certain amount of inconsistency in these requirements. The majority of farmers are, even to-day (after nearly 20 years of the operation of the Act of 1906), more conversant with the term " ammonia " than with " nitrogen." It is even more generally true that, while they have become familiar with the expression " phosphates," they know little or nothing of " phosphoric acid." On the other hand, as a scientific fact, many nitrogenous fertilisers do not contain ammonia, although they do, of course, contain nitrogen. Similarly, some of the most valuable phosphatic fertilisers contain no appreciable amount of tri-calcium phosphate, their phosphates being present in another form.

There appear to be three courses from which to choose. Either the old, familiar names can be retained, the scientists acquiescing in the use of unscientific terms so as not to cause present trouble to farmers, and the farmers being left to obtain more precise knowledge of the matter as they become, individually, more interested in the science of their calling ; or the scientifically correct terms can be adopted at once, in the hope and belief that agriculturists generally will soon become well acquainted with their significance and that a more complete harmony between farmers and their advisers may result ; or a combination of these can be devised by requiring that both nitrogen and ammonia, phosphoric anhydride and tri-calcium phosphate, shall be given in every case. It seems to us that, sooner or later, the second course, which is the logical one, will have to be adopted, and, that being the case, we think it may be well to avoid further delay.

It is only fair to add that, in arriving at this decision, we have been influenced by one other fact. While we recommend that the amounts of nitrogen, phosphoric acid and potash should be the statutory requirement, we think that a seller should not be prohibited or discouraged from adding a statement of the equivalents in other units, provided that they are clearly stated to be equivalents. In other words, we consider that the seller of, for instance, fish manure containing 9 per cent. of nitrogen and 7 per cent. of anhydrous phosphoric acid should be compelled to state those figures, but should also be permitted to state that the amount of nitrogen present is equivalent to 11 per cent. of ammonia and the amount of phosphoric acid to 15 per cent. of tri-calcium phosphate. In this connection, we think it important that provision should be made that the expressions " soluble phosphates " and " insoluble phosphates," when used in statements of equivalents, should continue to have the meanings given to them by the present Act.

In the case of both the constituents under consideration, the alternative figure is larger than that which will be required by statute. The natural desire of manufacturers and traders is to assist their customers as much as they can, if only as a matter of business, and as, in this case, their own interest clearly lies in the same direction as that of their farmer customers, there is little doubt that tri-calcium phosphate, in addition to phosphoric acid, and ammonia in addition to nitrogen, will be given, as a general rule, for some time to come. The effect, therefore, will be, we think, that until farmers have had ample opportunity to become acquainted with the new terms, they will normally be furnished with statements in both the old and the new terms, not as a result of statutory requirements, but because of business considerations.

Lime, Limestone and Chalk

Quick lime, slaked lime, limestone and chalk all fulfil the same function in agriculture, namely, that of supplying lime

(calcium oxide) to the soil; but equal weights of these substances do not provide equal quantities of calcium oxide. It has, accordingly, been thought that the seller should not only be required to state, in effect, the percentage of purity of the article, but should also be required to give the pure lime (calcium oxide) equivalent, in order that the purchaser may be in a position to form an idea of its comparative value to him.

In the case of feeding stuffs, it is proposed that the terms "oil" and "albuminoids" shall be retained; but the expression "albuminoids" is giving place to "proteins," and we suggest that, as a step towards the change which must eventually take place, the latter word should be added, in parentheses, after "albuminoids."

Methods of Analysis

We have assumed that precise methods of analysis will be prescribed, at a later stage, in respect of each of the analytical requirements of the proposed Act, and our recommendations are made on that understanding. In this connection, there are two observations. The expressions "soluble phosphoric acid" and "insoluble phosphoric acid" have been used in several places in the Schedules. The meanings which we intend should be attached to "soluble" and "insoluble" in this connection are, respectively, soluble and insoluble in water. It will, we understand, fall to the lot of our successors to recommend the quantities of solvent and of fertiliser and the method to be used in each case, and they will, no doubt, have regard to the intention that the solvent should be water. It will, we think, be found that one method of analysis will not be sufficient adequately to meet the cases of the potash in compound fertilisers, guano and kainit, on the one hand, and the potash in certain of the potassium salts on the other. We would recommend, therefore, that the Committee which will be called upon to deal with the question of prescribed methods of analysis should consider the desirability of prescribing a "water soluble" method for such substances as muriate of potash and an "acid soluble" method for kainit, guano and compound fertilisers.

"Deleterious" and "Worthless" Ingredients

The preparation of draft proposals as to the substances which should be scheduled as "deleterious" and "worthless" respectively, was undertaken by a third Sub-Committee which reported that, in their opinion, it is not practicable, at present, to prepare schedules of either deleterious or worthless ingredients of fertilisers, but they submitted Schedules showing the classes of substances which they considered should be regarded, respectively, as "deleterious" and "worthless" ingredients of feeding stuffs. The report of the Sub-Committee and the Schedules which it covered were adopted by us with one or two amendments.

Quality and Condition of Fertilisers

It is provided in the Act of 1906 (and we presume that the provision will reappear in any legislation which may supersede it) that there shall be an implied warranty by the seller that any article sold as food for cattle or poultry is suitable to be used as such. No similar provision has been made, however, in the case of fertilisers. The difficulty is the same as that which has been met with in attempting to schedule worthless ingredients in fertilisers. It is doubtful whether there are any substances likely to be sold as fertilisers which would be "unsuitable" in the sense that no type of soil would be improved, either physically, chemically, or biologically, by their application.

Even if the implied warranty, in the case of fertilisers, was that the substance should be in a suitable condition for application to the land, we are afraid it might give rise to difficulty rather than prove an advantage. We are, in fact, inclined to think that very little injury results from the lack of a provision of the kind in question. The principal sufferers are, no doubt, those who buy such products as fur waste and rabbit flick, and it seems to us that the risk they take of getting some large pieces of material, which may take years to rot down, is inherent in the transaction. The substances are not prepared as fertilisers; they are in no way "manufactured" by those who collect and dispose of them; and the only practicable alternatives seem to be either to buy them in the condition in which they are available or not to buy them at all.

We think it will be impossible to devise a general provision narrow enough to provide only for the cases of real hardship and yet adding to the protection already afforded by the Sale of Goods Act, 1893. In the circumstances, therefore, we have decided to call attention to this matter, in case it may be possible to find a suitable form of words, but to make no definite recommendation in respect of it.

Glasgow's Chemical Undertaking

Report on Recent Developments

THE annual report of the Chemical Works Department of the Glasgow Corporation Gas for the year ending May 31 last has just been issued by Mr. J. Macleod, the manager. The report states that the principal items of new plant added this year are of an experimental character. Valuable information is expected to be gained from these plants. The new storage tank at Dawsholm, an order for which has been placed by the Committees, will soon be started. Much has been done to improve the tar and liquor supply pipes from the gas works, and the settling ponds and drains therefrom are receiving a complete overhaul against the coming winter's work. The sulphate plant side at Tradeston is in good order, and the clearance of certain dangerous buildings and the emptying of a filled-up storage well will improve matters by giving greater storage and consequently giving the plant a longer run. The provision of the new saturator, contract for which has been placed, will be a great help at Dalmarnock in providing a more rapid throughput of ammonia liquor, and the new loading bank now completed will facilitate the handling of materials. The clearing out of a disused pitch bay and the provision of another one will reduce the pitch-handling costs. One storage well has been emptied for the use of the Maclaurin plant products.

Research on Retort Pitch

Much research work has been done on vertical retort pitch, which remains a source of trouble to the Department, as elsewhere, but so far without permanent result. The new methods of distillation being experimented with at Dalmarnock will lead, however, to a greatly reduced yield of pitch, which will tend to minimise the problem. Further work has been carried out on high boiling tar acids, and improved working results are expected. The result of the past financial year's work has been very satisfactory in view of the lower level of prices of tar and ammonia products. The prices quoted for crude tar ranged from 26s. 10½d. per 100 gals. in June, 1924, to 23s. 3½d. per 100 gals. in May, 1925. The average price for sulphate of ammonia fell 19s. per ton as compared with the previous year, 1923-24. The yield of sulphate was up by 272 tons. The financial statement for the past year shows that after paying all working expenses, etc., and £25,989 4s. 5d. for rates, taxes, and interest on the book value of the plant, the net revenue is £193,407 14s. 11d.

The returns for the present year will be handicapped by the serious decrease in the price of sulphate of ammonia. The synthetic sulphate is coming on the market in increasing quantity, and this will be a serious menace to this side of the Department's business. The tar products side will yield, as compared with the sulphate side, if the present position is maintained, a return not so unfavourable. Taking into account the above two aspects of the position, the report states, it is not possible to estimate for other than a decrease on the previous year's results.

Italy's Export Trade

WHILE the output of boric acid in Italy in 1924 exceeded by 600 tons that of 1923, prices fell 20 per cent. as a result of competition on the export market, according to an official report. The year was a good one for the dyestuffs trade; output increased from 35 to 40 per cent., and Italian factories now meet approximately 60 per cent. of the demand on the home market, and exports absorb about one-thirtieth of the total output. The electrolytic branch of the chemical trades also experienced a good year, and there was an active demand for soda and chlorine produced by these processes. The greater output of the cotton and artificial silk factories reacted favourably on these products. There was, moreover, a considerable export trade with the markets of Northern Europe. The increased activity of the chemical industries is evidenced by the reduction of unemployment. At the end of 1923, there were 5,591 unemployed in the chemical trades, but at the end of 1924 the number had fallen to 2,378.

Chemical Co-operation in the Dyehouse

(By a Consulting Chemist)

The question as to whether a dyehouse should be controlled, or even have a laboratory attached to it (writes "A Consulting Chemist" in *The Manchester Guardian Commercial*) has long been a matter of very varied opinion. In the writer's opinion, to run a dyehouse successfully, the co-operation of a chemist is as much a *sine qua non* as the employment of the dyestuffs themselves. A consulting textile chemist naturally draws his clients chiefly from the class of manufacturer or dyer who does not run a laboratory of his own. In some cases the consultant may be employed upon a retaining fee, and gives a certain amount of time to routine work of the dyehouse, keeping a watchful eye upon the processes in general; but more often he has merely specific cases of difficulties or complaints referred to him. It is these difficulties or complaints, and especially the latter, which have induced me to make this sweeping statement.

The vast majority of such difficulties and complaints would never arise if these dyehouses had been under efficient chemical supervision. If a manufacturer or dyer would consider what a complaint arising out of a faulty dyeing may mean, he would at once recognise the necessity of that supervision. Take, for example, the dyer who has dyed some cotton warp which is to be used for a stripe effect in shirting. The warp is faulty, due to one of many causes—use of improper dyestuffs, faulty chemicals, tendering, or other of many other causes. The fault in the warp is not discovered until the piece is woven and perhaps made up. The claim made upon the dyer is not merely his charge for dyeing or the value of the cotton warp he dyed, but the value of the piece or even the finished shirts. The claim against the dyer for damages resulting from dyeing may, therefore, outweigh the value of the goods he handled. Such a condition of things exists for every dyehouse. The lucky firm goes on probably with only minor claims, while the unlucky one gets the big claims, just in the same way as the lucky firm has no fires while the unlucky one gets burned.

Advantages of a Chemical Service

Lucky or unlucky, all business firms insure themselves against fire, and so should every dyehouse insure itself against possible complaint by the co-operation of a chemist. The difference between these two forms of insurance is this: in the case of fire, the insurance provides compensation for the damage done, but with the chemist his employment or co-operation is a preventive, and so protects both the pocket and the reputation of the dyer. In addition to this insurance against complaints, a chemical service offers the dyer many other advantages. First of all, it enables him to buy all his dyestuffs, chemicals, soaps, and other drysalteries upon a chemical basis, and have them tested before being placed in stock. This not only prevents a wrong strength or quality of a chemical being put into stock, and so finding its way into use, but it at once places the buying upon a sound economical basis.

A chemical service next allows each process to be thoroughly studied and put upon the most economical basis. Dyeing is a chemical process, and no chemical process can be considered economical or efficient which is not from time to time submitted to chemical test. Again, a vast amount of time and money can be saved and error avoided when material that has to be dyed to a submitted or competitive pattern is first submitted to the laboratory for recognition of dyestuff class and shade matching. This is a very important point when considering or quoting against competitive work, and might lead, by a wrong selection of dyestuff class, to very serious damage or to loss of orders through over-high charges.

Some little time ago, I met with a case which, while by no means common, will serve as an example of what might happen in a dyehouse lacking chemical co-operation. A manufacturer, in an attempt to save part of what he considered the excessive charges made by dyers, decided to establish a dyeing department in connection with his mill. A dyehouse was built and a dyer engaged. Some time later it was found that stocks were getting wrong, and it was discovered that t was the dyer's practice, when a colour went wrong or did not come up to shade, to put it into black, and when a black dyeing went wrong, to put the yarn in the boiler fire. This not only meant loss of yarn, but of dyestuff chemicals, wages, steam, etc.

To-day the trend of development in dyestuffs and dyeing methods is towards the more highly scientific, requiring greater chemical knowledge and chemical control. If our dyers are to make real use of the work being done by the dyestuff manufacturers, then, surely, they must have the necessary chemical knowledge available. One of the greatest curses which has befallen our dyeing industries in the past was the very capable technical service developed by the German dyestuff manufacturers. If a dyer got into a difficulty, all he had to do was to pass it on to one of the German agencies and get the problem more or less solved. I can conceive nothing more detrimental to an industry than this method of spoon-feeding; it takes from it all individuality, retards any real progress, keeping it in a perpetual state of infancy.

Against the many advantages which come to a dyer from a chemical service, the only real argument I can see put forward is the one of expenses, although I have had several others offered. Expense is a real factor, but one which can be met. If the dye-house is not of sufficient size to make it possible, then the dyer would have no difficulty in arranging with one or other of the many outside laboratories to undertake the necessary work at a suitable fee.

Carbon Black from Natural Gas

The manufacture of carbon black from natural gas is based on the incomplete combustion of the gas, the carbon being caught on a metal surface in contact with the flame. The carbon is released in the interior section of the flame where the heat dissociates the methane and where the oxygen content is low. Methane will burn in 15 per cent. oxygen and the yield of carbon from this process is low, representing only about 4 per cent. of the total carbon content in the gas, or about one pound of carbon per 2,000 cubic feet of gas. The actual theory underlying this process is that not all the gas is burnt, and the heat from that proportion which does burn is employed to decompose the remainder.

It seems probable that the process now in force will be either improved or displaced, and various suggestions have been put forward to increase the yield of available carbon in natural gas. One of these is the chlorination of the gas and the splitting up of the methane into hydrogen chloride and free carbon. Another is the cracking of methane at a low temperature in the presence of a suitable catalyst. These and other processes have been tried but have not warranted operation on a commercial scale.

In the present commercial process the gas is burnt in steatite-tipped burners placed four to five inches apart. Over these burners are fitted plates of highly-polished grooved steel which are rotated and drop the carbon as it is collected into a receptacle. The temperature of these steel plates is maintained not higher than 300° C. so that the released carbon is cooled immediately below the firing point. If the temperature is allowed to drop much below this point the surface is too cold to permit proper separation of the carbon, and if the temperature is much higher the collected carbon is subjected to partial combustion. An even temperature of 300° C. is found to allow combustion of the gas at such a temperature that the resultant carbon is not adulterated with hydrocarbons.

The carbon black thus obtained is very deep in "colour" and has a soft velvety texture, entirely different from the carbon obtained by the incomplete combustion of oils. A higher yield of carbon from natural gas is obtained by passing the gas through a refractory-filled retort and subjecting it to a temperature of 1,250° C. Though the yield from this process is about 35 per cent. the carbon is poor in quality and contains gritty particles.

Carbon black from natural gas is used chiefly in the manufacture of rubber and printing ink. In the manufacture of rubber the carbon is easily mixed on account of its very finely divided state, and it is valuable because it retards oxidation and assists the rubber to resist the action of light. Other uses for this form of carbon are in gramophone records, paints, stove polishes, leather, typewriter ribbons, tiles, insulating materials, crayons, celluloid and artificial stone.

From Week to Week

MR. DESIRE CHARLES FELIX DE VOS, chemical engineer and works manager, of Bowdon, Cheshire, is applying to the Home Secretary for naturalisation.

A FURTHER SUGAR BEET factory is to be erected in Essex by the Anglo-Scottish Beet Sugar Corporation, Ltd. The company is already interested in factories at Colwick, Kidderminster, Spalding, and Selby.

DURING THE FIFTH ANNUAL MEETING of the French Society of Chemical Industry, to be held in Paris during the week beginning October 4, the centenary of the discoveries of Chevreul will be celebrated.

COAL BY-PRODUCT WORKS were the subject of a recent letter to *The Times*, expressing the hope that the Royal Commission would not fail to make a searching inquiry into the close association of by-product works with mines.

BY PUMPING CALCIUM CYANIDE into the burrows, some hundreds of rats were destroyed at Edmonton sewage farm on Tuesday. The Council authorities expressed themselves as completely satisfied with the results of this method.

AFTER 25 YEARS AS GENERAL MANAGER of Babcock and Wilcox's Water Tube Boiler and Engineering Works at Renfrew, Mr. R. A. M'Laren is to retire at the end of the year. Mr. M'Laren will continue to act in an advisory capacity.

A BOUNTY OF 4D. PER GALLON on Australian produced alcohol has been approved by the Commonwealth Parliament. To qualify the spirit must be made from cassava, sweet potatoes, arrowroot, or other authorised starch-bearing plants.

REGULATIONS for the establishment of an eight-hours day in French chemical works are contained in a recently issued Government decree. Electro-chemical, electro-metallurgical, and gasworks, which are controlled by the previous decrees, are not affected by the new order.

IMPORTANT KEROSENE SHALE DEPOSITS in New South Wales are referred to in the official report of oil exploration just published by Dr. Wade. He describes them as the richest in the world, and considers that they constitute one of Australia's greatest assets, and may eventually become more profitable than oil wells.

AN IMPORTANT CONTRACT has been made with Johnson, Matthey and Co., of London, by the Norwegian Government. The firm, which are well known in the chemical industry as assayers and analysts in the precious metal industry, are to purchase the Government's stock of withdrawn fractional coin of the nominal value of about 16,000,000 kroner.

A RECENT ANALYSIS of the membership of the American Chemical Society shows that 58 per cent. are engaged in managing the manufacture and marketing of products in which chemistry is involved, that 11 per cent. are employed in chemical development work, and another 11 per cent. in chemical control work, and that the remaining 20 per cent. are professors or teachers.

REPORTS STATE THAT Courtaulds, Ltd., and Vereinigte Glanzstoff-Fabriken, of Elberfeld, have reached a reciprocal agreement for the protection of their several markets. This is believed to be the first step in international concentration in the artificial silk industry. It is reported that the Government's first measures to deal with the rise in prices will be directed against cartels.

NO BLAME WAS ATTACHED TO COURTAULDS, LTD., at the inquest on two men who were fatally affected by fumes at the Cornwall, Ontario, factory (see THE CHEMICAL AGE, July 18). Some alterations were being made in the acid vat to correct a residue that was left after pumping, thus clogging the pipes. It is thought that the accident arose through the presence of a pocket of sulphuretted hydrogen.

A COMMENT ON THE NEW FOOD PRESERVATIVE REGULATIONS has been offered in an interview by Leeds City Analyst, Mr. B. A. Burrell. He regards sulphur dioxide and benzoic acid as more or less harmless in small quantities. The latter was certainly an improvement on boric acid or salicylic acids, which were allowable until the regulations came into force. No boric acid, he considered, should be used in butter.

A RECORD RUN FOR A GLASS-MELTING FURNACE is reported from the works of the Kinghorn Bottle Co., Ltd., Kinghorn. The tank has just given way after working continuously, producing bottles day and night, for two years and five months at a temperature of 1,400° C. During this period over 21,000,000 good bottles have been produced, and as the usual run for a glass tank is a little over a year, this case is thought to be a world's record.

DR. STINNES, it is stated, in addition to resigning from his directorships connected with the Nordstern insurance concern, has also withdrawn from the boards of the Hugo Stinnes Riebeck Mining and Oil Co., the Deutch-Luxemburg Mining and Foundry Co., the Gelsenkirchen Mining Co., and the Bochum Mining and Cast Steel Co, whilst remaining a director of the so-called family companies, the Mulheim Mining Co. and the Matthias Stinnes Mine.

AN EXPLOSION destroyed the Mohndorf chemical works at Wiesbaden, four bodies being recovered.

DR. E. F. ARMSTRONG, managing director of the British Dyestuffs Corporation, is away on holiday and is expected to return about the second week in September.

MR. J. H. WILKINSON, of Melbourne, interested in artificial silk manufacture, will be in Manchester on September 20, and can be communicated with c/o Australia House, Strand, London.

MR. L. P. O'BRIEN and Mr. I. E. Weber have been appointed directors of B. Laporte, Ltd., chemical manufacturers, Luton. Both gentlemen have held responsible positions on the staff.

AN ALUMINIUM SYNDICATE is reported from Cologne, and most of the large rolling mills are participating. The association will deal with sales and export and the exclusion of price-cutting.

MR. THOMAS PILKINGTON, of The Steyne, Manor Road, Bournemouth, a director of Pilkington Bros., Ltd., left unsettled property of the gross value of £688,578, with net personalty £686,820.

RECENT TENDERS ACCEPTED INCLUDE construction of percolating filters, humus tanks, etc., for Dewsbury Corporation, S. Johnson and Co. (Mirfield), Ltd., £47,527 6s. (recommended); Transformer oil (6,000 galls.) for Sheffield Electricity Committee, Shell-Mex, Ltd., 2s. 3½d. per gallon.

A NEW LIQUID MOTOR FUEL known as Carbonan has been invented by a Russian engineer named Makhonin, according to advices received by the American Chemical Society from Horten, Norway. The basis of the fuel is coal tar. It is designed for use in countries not producing oil. It is reported the fuel has been tested successfully by French naval authorities.

A NEW PROCESS has been discovered by a Belgian which is said to render artificial silk yarns and fabrics non-inflammable. It has been acquired by M. Armand Wolff, of Paris and Brussels, who claims that materials passed through a chemical bath after the first acid bath are rendered fireproof and that the treatment adds less than 1 per cent. to the cost of manufacture. Steps are being taken to patent the new process in most countries of the world.

PROFESSOR H. E. ARMSTRONG, pursuing his experiments with a view to determining the effect of certain acids as food preservatives, has come to the conclusion that "boric acid is active, but penetrates very slowly in comparison with benzoic—about the ratio of days to hours." The result of his experiments with benzoic and salicylic acids is to show that there is "not a pin to choose" between the allowed and the disallowed acid. The hand of the Ministry of Health he claims, should be stayed until a searching scientific inquiry has been made.

HAYNES STELLITE CO., of 30, East Forty Second Street, New York, manufacturers of Stellite metal cutting tools and other articles of these high speed, rust and corrosion resisting alloys, has just completed concentration of the company's activities at its plant at Kokomo, Ind. All service in connection with the company's products will hereafter be extended direct from the plant. Headquarters for administration, sales and engineering activities will be at Kokomo, these being conducted under the direction of Mr. C. G. Chisholm, general manager.

A NEW LIME WORKS is to be opened on the Hartley Manor Estate, near Kirkby Stephen, by Sir Hedworth Williamson's Fulwell Lime Works, Ltd., Sunderland. The intention is to produce a very pure quality product for manufacturing processes. The kilns to be erected will be of the most modern gas-fired variety, making their own gas with producers. It is also anticipated that a tar macadam and road stone plant will be installed. The erection of plant will probably take a little over twelve months. The company was incorporated in 1911 as a private limited company, to take over Fulwell Quarries, near Sunderland, which had been worked by the Williamson family for over 150 years.

EXPERIMENTS IN GRASSLAND FERTILISATION have been completed this week by Colonel Fetherstonhaugh, The College, Kirkoswald. North African phosphates were chiefly used, containing 60 per cent. phosphates, 80 per cent. passing through a 120 sieve. The cost was one-third less than basic slag, and it was applied to land which appeared to need "freshening" at the rate of 6½ cwt. per acre, while other land received only half that quantity. The land varied in character from medium to lighter loam on a strong subsoil, with one portion peaty, and was all old-laid grass. At a demonstration Professor Gilchrist, of Newcastle, pointed out the great improvement of the herbage on the land to which the phosphate was applied, compared with that on untreated land in the same fields. On lighter loam fields, kainit was applied at the rate of 4 cwt. per acre, but it has not helped the action of the phosphate, and from the excellent results of the phosphate alone, it is not likely that lime dressings would help their efficiency, but rather the reverse. On meadowland, application of the North African phosphate followed by dung produced improvement in the herbage.

Obituary

MR. CHARLES COMINS, chairman of W. Sutton and Co., of London, wholesalers in druggists' sundries, and largely interested in gas undertakings in various counties; also chairman of W. Cohen and Co., metal merchants.

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Abstracts of Complete Specifications

237,302. Acetic Anhydride and Acetic Acid, Manufacture of. British Celanese, Ltd., 8, Waterloo Place, London, S.W.1, and W. Bader, of British Celanese, Ltd., Spondon, near Derby. Application date, January 24, 1924.

It is known that acetic anhydride may be converted into acetone and carbon dioxide by heating in the presence of a catalyst, and it has now been found that this reaction is reversible and that acetic anhydride may be produced from acetone and carbon dioxide under pressure, using the same catalysts. The process may be carried out by saturating carbon dioxide with acetone vapour at about 20° C., and passing it through a tube filled with wood charcoal heated to 350° C. Other suitable catalysts are oxides and carbonates of lithium calcium, barium, strontium, magnesium, zinc, cadmium, iron, aluminium, chromium, uranium, manganese, thorium, zirconium, titanium, cerium, and tin; also silica, Portland cement, and metallic copper. Water vapour may also be present, in which case acetic acid is formed.

235,306. Ores or Residues containing Zinc, Treatment of. S. C. Smith and The Chemical and Metallurgical Corporation, Ltd., 701, Salisbury House, London, E.C.2. Application date, January 29, 1924.

The object is to obtain zinc carbonate and hydrochloric acid from a solution of zinc chloride which is obtained by extracting ores or residues containing zinc. This is effected by heating the zinc solution with barium carbonate to precipitate zinc carbonate. The solution of barium chloride is treated with sulphuric acid to obtain hydrochloric acid, and the barium sulphate precipitated may then be converted into carbonate. The zinc chloride solution is first freed from hydrochloric acid by concentrating, and neutralising with ore, and any lead present is precipitated by adding metallic zinc. Iron and manganese are then precipitated by boiling with zinc oxide, and any lead remaining is removed by adding zinc. The sulphates in the liquid are then converted into chlorides by adding barium chloride, and zinc carbonate is then precipitated by heating with freshly precipitated barium carbonate. The zinc carbonate is removed, and the liquor treated with sufficient sulphuric acid to precipitate the barium. The liquor contains free hydrochloric acid for use in leaching the ore.

The process also includes a, method for purifying the leaching liquor at each cycle. The solution is cooled to cause a partial crystallisation of lead salt, which is removed from the liquor. The liquid is then neutralised and treated with metallic zinc to precipitate lead, which is removed together with any excess of zinc. Any iron present is then oxidised, precipitated by boiling with zinc oxide, and the precipitate removed. Any remaining lead is removed by means of zinc, and sulphate ions by means of barium chloride, leaving a zinc chloride solution which is treated as above.

237,375. Dyestuffs, Manufacture of. O. Y. Imray, London. From Soc. of Chemical Industry in Basle, Switzerland. Application date, May 8, 1924.

These dyestuffs are obtained by treating the 2 : 5-diarylidobenzoquinones with a sulphur halide or a sulphurous acid halide, *e.g.*, the sulphur dihalides, sulphur mono-halides, and thionyl-halides. There may also be present a solvent or dispersing agent, an acid-binding agent, and a condensing agent. Those 2 : 5-diarylido-benzoquinones are particularly suitable which are not substituted, or are only monosubstituted in the quinone nucleus, and these react at the ordinary temperature. The 2 : 5-diarylido-benzoquinones may be derived from two aromatic amines which may be the same or different and may be monosubstituted at the nitrogen, or mono- or poly-substituted at any position in the nucleus. The substituents include halogen, alkyl, phenyloxy, nitro-amino, alkylamino, arylkylamino, phenylamino, hydroxyl, or carboxyl groups. The dispersing agents employed include nitro-benzene, chloro-naphthalene, chloro-benzene, benzene, or one which is simultaneously a condensing agent like sulphuric acid, chloro-sulphonic acid, formic acid, acetic acid. A large number of examples are given of the use of various diarylido-quinones, sulphur halogen compounds, and solvents, and particulars of the colours obtained.

237,385. Indigoid Dyestuffs, Manufacture of. O. Y. Imray, London. From Soc. of Chemical Industry in Basle, Switzerland. Application date, May 19, 1924.

Vat dyestuffs are obtained by condensing the halogen substitution products of isatin with 2 : 1-naphthindoxyl. These give brown to olive shades on cotton. Examples are given of the condensation of 2 : 1-naphthindoxyl with 7-chlorisatin and 5 : 7-dibromisatin.

237,394. Catalysts for Synthesis of Ammonia. Synthetic Ammonia and Nitrates, Ltd., Billingham, Stockton-on-Tees, Durham. From E. Collett, Munkedamsverein 27, Christiania. Application date, May 29, 1924.

Very high pressures may be avoided in the synthesis of ammonia by the use of ferrites and ferrates as catalysts. Calcium ferrite is preferred, and is obtained by heating a mixture of calcium oxide and iron oxide in an electric furnace. The product is crushed for use as a catalyst, and the synthesis is effected at a temperature of 500° C., and pressure of 90 atmospheres. Other ferrites and ferrates obtained from barium, magnesium, manganese, and other elements which are not active contact poisons, may also be used.

237,413. Suspensions of Iron Compounds, Manufacture of. Woodall Duckham (1920), Ltd., E. W. Smith and T. C. Finlayson, 52, Grosvenor Gardens, London, S.W.1. Application date, June 24, 1924.

An alkaline suspension of ferric hydroxide which is made by neutralising a solution of ferric sulphate with sodium carbonate solution is difficult to treat in filter presses for the removal of the ferric hydroxide. In this invention, ferric sulphate and sodium carbonate are mixed together in a solid state and then added to water in the proportion of not less than 15 parts of the mixture to 1,000 parts of water. Hydrated ferric oxide or ferrous carbonate is produced and remains in suspension in the water. It may be readily separated from the liquid in which it is suspended, or from other solid matter suspended with it. If the suspension is present in the ferrous condition it may be oxidised by blowing air through it.

237,308. Lead Chloride or Basic Chloride, Treatment of—to Convert it into other Lead Compounds, and Application to the Extraction of Lead from Ores. S. C. Smith and The Chemical and Metallurgical Corporation, Ltd., 701, Salisbury House, London, E.C.2. Application date, January 30, 1924.

The object is to convert lead chloride which is frequently obtained from ores, etc., into lead carbonate. The lead chloride is finely divided by grinding or otherwise, and is suspended in a solution of ammonia and a current of carbon dioxide passed through it, ammonia being added to replace that carried away by the gas. The partial pressure of the carbon dioxide may be above one atmosphere. The lead carbonate is filtered off, and the liquor divided into two portions. One portion is diluted with water and ammonia is added, so that it may be used for treating a further quantity of lead chloride with carbon dioxide. The other portion is treated by known methods for the recovery of its constituents. The ammonium chloride recovered may be treated with lime for the extraction of ammonia for use in the process.

In the application of this process to the treatment of zinc sulphide ores containing lead, the ore is roasted to render the zinc soluble in sulphuric acid, leaving a residue containing lead and silver sulphates. This residue is treated with a hot chloride solution containing a little acid to dissolve the lead and silver, and the silver is then removed, leaving lead chloride which is treated as above. The process is applicable to several other methods of obtaining lead from ores and concentrates which involve the production of lead chloride.

237,415. Gases Rich in Ethylene, Process for Obtaining. W. Carpmael, London. From Chemische Fabriken vorm. Weiler-ter-Meer, Uerdingen, Niederrhein, Germany. Application date, June 26, 1924.

Gases obtained by the destructive distillation of tar oils and petroleum fractions usually contain not more than 20

per cent. of olefines including substantial proportions of higher olefines. In this invention, tar oils having a boiling point of 250° C. or above, are destructively distilled at 800–900° C. in the presence of steam. In these circumstances the gases obtained have an olefine content of 40–50 per cent., consisting mostly of ethylene. This result is not obtained in the absence of steam. In an example, oil obtained by distillation from lignite generator tar having a boiling point of 300°–350° C., is mixed with an equal quantity of water and passed through an iron tube heated to 900° C. The gas yield is 300–400 litres per kilogramme of oil, and it contains 44–48 per cent. of ethylene. A similar treatment in the absence of water yields a gas containing only 30 per cent. of olefines. The use of tar oils has the advantage over petroleum fractions in that no highly saturated hydrocarbons are obtained together with the olefines. In such case the separation of ethylene and ethane is difficult. Ethylene can be extracted from the gases obtained, by treating with active charcoal, whereby 88–90 per cent. of ethylene can be obtained.

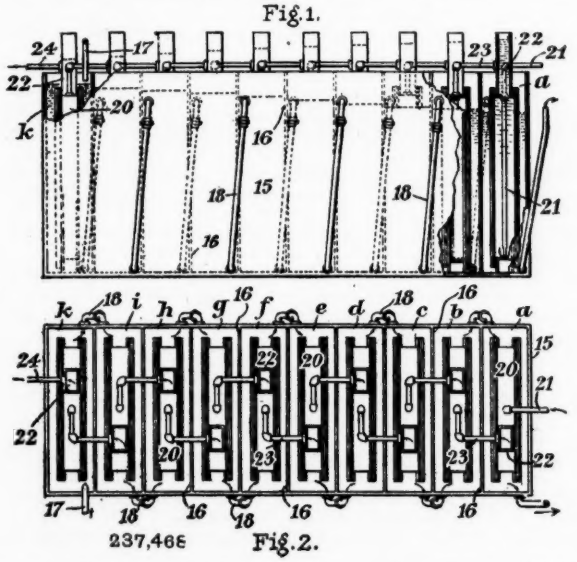
237,457. Colour Lakes, Manufacture of. British Dyestuffs Corporation, Ltd., J. Baddiley, R. S. Horsfall, A. Shepherdson, and H. Jackson, 70, Spring Gardens, Manchester. Application date, September 23, 1924.

It has been found that unsulphonated amino-hydroxyanthraquinones which have not usually been applied for dyeing on textile materials can be employed for the manufacture of lakes by treating them in a fine state of division with the metal compounds usually employed. Dispersing agents such as turkey red oil may also be added. The amino group in the unsulphonated amino-hydroxyanthraquinones may be substituted, *e.g.*, by alkyl or aryl groups, and the free positions in the anthraquinone nucleus may be substituted by such groups as methyl or halogen. Particulars are given of the shades of alumina lake obtained from 1 : 4-amino-hydroxyanthraquinone, N-methyl-diaminoanthrarufin, 1-amino-2-brom-4-hydroxyanthraquinone, 1-para-tolyl-amino-4-hydroxyanthraquinone, and diamino-chrysazin.

237,468. Recovering or Separating Caustic Hydroxides from Solutions containing them, Apparatus for. J. Y. Johnson, London. From The Viscose Co., Marcus Hook, Delaware County, Pa., U.S.A. Application date, October 23, 1924.

This dialytic apparatus is employed in the recovery of caustic oxides from waste solutions such as the liquor obtained

Fig.1.



237,468 Fig.2.

in the steeping operation in the manufacture of artificial silk, waste caustic liquors from the mercerisation of yarns, and black liquor from the digesters of pulp mills. A tank 15 is divided by partitions 16 into a series of compartments *a*—*k*. Water is delivered by a pipe 17 to the top of the compartment *k* and pipes 18 connect the bottom of each compartment with the top of the next. Each compartment contains a dialytic cell 20 spaced from the bottom and the sides of the compartment. The impure caustic liquor is supplied by a pipe 21 to the bottom of the cell in the compartment *a* and the top of the cell is provided with a hood 22 having an outlet pipe 23 leading to the bottom of the cell in the compartment *b*, and so on to the outlet 24. The density of the liquor diminishes as it gradually loses its caustic alkali by dialysis in each compartment, and the hoods 22 are provided to give a sufficient head to cause the liquor to flow from cell to cell. The level of the liquid in the hoods increases from the entering end to the discharge end of the series, and the liquid level in the surrounding compartments also decreases from the entering end to the discharge end, *i.e.*, in the opposite direction to that of the caustic liquor. The level is determined by the height of the outlet 19. The strength of the pure caustic solution discharged from the pipe 19 can be regulated by controlling the supply of liquor entering at 21, and the supply of water entering at 17. A detailed description is given of the construction of each dialytic cell.

237,528. Formamide, Manufacture and Production of. J. Y. Johnson, London. From Badische Anilin und Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, March 14, 1925.

In this invention, ammonium formate can be rapidly and completely transformed into formamide by passing it with ammonia over a catalyst. To prevent the formation of cyanhydric acid, the temperature should be 100°–200° C. Catalysts of a dehydrating character are suitable, *e.g.*, bauxite, alumina, titanium-oxide, thoria, silica, iron oxide, and other oxides, aluminium phosphate, china clay, pumice stone, kieselguhr. These catalysts are heated to a high temperature before use. The ammonium formate can be replaced by formic acid if excess of ammonia is present. The formamide is separated from the reaction gases and water vapour by cooling. In an example, ammonium formate is evaporated in a current of ammonia at 140° C., and passes through a layer of calcined bauxite heated to 170° C. The formamide is condensed by cooling the gases to 60° C. and the gases are used again.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—211,882 (C. H. Leach) relating to condensing apparatus for refining oil, see Vol. X, p. 470 ; 214,221 (Standard Development Co.) relating to a process of making metallo-organic compounds, see Vol. X, p. 630 ; 214,999 (J. A. Du Bois) relating to production of hydrocyanic acid from sulphocyanic acid, see Vol. XI, p. 16 ; 221,487 (Farbenfabriken vorm. F. Bayer and Co.) relating to manufacture of highly active silica gels, see Vol. XI, p. 478 ; 222,147 and 226,224 (Synthetic Ammonia and Nitrates, Ltd.) relating to production and treatment of a nitrogen-hydrogen mixture for synthetic production of ammonia, see Vol. XI, p. 560 ; and Vol. XII, p. 184 ; 221,514 (Synthetic Ammonia and Nitrates, Ltd.) relating to production of ammonium nitrate, see Vol. XI, p. 504 ; 228,165 (Verein für Chemische und Metallurgische Produktion) relating to manufacture of barium chloride and alkali hydrosulphide, see Vol. XII, p. 315 ; 234,072 (Soc. of Chemical Industry in Basle) relating to separation of potassium and sodium hydroxides, see Vol. XIII, p. 108.

[Latest Notifications.]

238,520. Process for the manufacture of acetaldehyde. Soc. Chimique des Usines du Rhone. August 14, 1924.

238,523. Manufacture of vat dyestuffs of the anthracene series. Farbwerke vorm. Meister, Lucius, and Brüning. August 13, 1924.

238,543. Process for converting hafnium and zirconium phosphates. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. August 13, 1924.

238,566. Rectification of acetic acid. Soc. des Etablissements Barbet. August 14, 1924.

238,574. Manufacture of derivatives of benzanthrones. Farbwerke vorm. Meister, Lucius, and Brüning. August 15, 1924.

International Specifications not yet Accepted

235,919. Dyes. Chemische Fabrik Griesheim Elektron, Frankfurt-on-Main, Germany. International Convention date, June 20, 1924.

Pyrazoleanthrone and thiazoleanthrone dyes are halogenated by dissolving in oleum or chlorsulphonic acid, and treating

with chlorine or bromine in presence of iodine. Examples are given.

236,145. CATALYSIS. I. W. Cederberg, 10, Friedrichstrasse, Steglitz, Berlin. International Convention date, June 24, 1924.

Gaseous mixtures which are liable to explode are caused to react by forcing the mixture through a cooled pipe containing a catalyst in the form of a solid cylinder which leaves an annular clearance space of one millimetre. The catalytic combustion of ammonia-oxygen mixtures can be effected by this process.

236,146. SYNTHETIC DRUGS. J. D. Riedel Akt.-Ges., 1, Riedelstrasse, Britz, Berlin. International Convention date, June 28, 1924. Addition to 223,221.

To obtain β-monochlorallyl-isopropyl-barbituric acid, a solution of isopropyl-barbituric acid in caustic soda is heated with 1:2-dichloro-2:3-propylene, or the sodium salt of isopropyl-barbituric acid is treated with 1-bromo-2-chloro-2:3-propylene.

236,151. COKING. Allgemeine Vergasungs-Ges., 73, Kurfurstendamm, Halensee, Berlin. International Convention date, June 24, 1924.

Bituminous coal is heated to 325° C. until all matter volatile at that temperature is removed, by passing inert gas heated to 500° C. upwards through the coal in a retort. The coking is then proceeded with.

236,152-3. OBTAINING TUNGSTEN. Naamlooze Vennootschap Philips' Gloeilampenfabrieken, 6, Emmasingel, Eindhoven, Holland. International Convention dates, June 27 and June 28, 1924.

236,152. A fused tungstate or mixture of tungstates is electrolysed above 900° C. to obtain a deposit of tungsten powder. Electrolytes employed are lithium tungstate or a eutectic mixture of lithium and potassium tungstates melting at 500° C., or a mixture of sodium and potassium tungstates melting at 650° C. To avoid an excess of tungsten oxide and consequent precipitation of "tungsten bronzes," alkali peroxide is added to the electrolyte, but not in sufficient quantity to redissolve the tungsten. A current of 5 amps. per sq. cm. at 2·75 volts is employed.

236,153. If in the process described in 236,152 above, a current density of 75 milli-amps. per sq. cm. at 0·08 volts is employed with an electrolyte of lithium tungstate heated above 900° C., the tungsten is obtained as a coherent layer. Other electrolytes described above may be used, and precautions must be taken against the precipitation of "tungsten bronzes." The cathode may consist of a tungsten wire rod comprising a single crystal which grows while maintaining its form, or the cathode may be of copper or iron coated with copper. The anode may be a cylinder surrounding the cathode, or may be a number of rods forming a cylinder.

236,170. PURIFYING ANTHRACENE; CARBAZOLE. Verein für Chemische und Metallurgische Produktion, Aussig, Czecho-Slovakia. International Convention date, June 28, 1924. Addition to 233,734.

Specification 233,734 (See THE CHEMICAL AGE, Vol. XIII, p. 71) describes the heating of crude anthracene with caustic alkali without distilling off the water formed in the presence of an indifferent solvent boiling at 300° C. In this invention, lime or other alkaline earth oxide is added to combine with the water, and a solvent boiling at 220°-260° C. may be used. Pure anthracene and carbazole are obtained.

236,190. VARNISHES. Atlas Powder Co., 9th Street, Wilmington, Del., U.S.A. Assignees of S. D. Shipley, 47, Hillcrest Avenue, Stamford, Conn., U.S.A., and G. C. Given, 544, Main Street, Stamford, Conn., U.S.A. International Convention date, June 24, 1924.

Nitrocellulose is dissolved in "ethyl glycol" having the formula $OH:CH_2.CH_2OC_2H_5$ with or without a diluent such as a benzene or petroleum hydrocarbon or an acyclic alcohol. The nitro-cellulose may first be dissolved in ordinary solvents such as acetic acid esters of acyclic alcohols together with resins, oils, and camphor, tricresyl phosphate, etc.

Specifications Accepted with Date of Application

215,724. Iron ores, Process and apparatus for reducing. J. G. Aarts. May 8, 1923.

215,783. Acetate silk, Process for dyeing. Farbenfabriken vorm. F. Bayer and Co. May 9, 1923.

227,125. Electrolytic extraction of tin contained in bronzes, Process and installation for—recovering copper at the same time. O. Scarpa. January 5, 1924.

227,822. Electrodes for electric furnaces. Norske Aktieselskab for Elektrokemisk Industri Norsk Industri-Hypotekbank. January 17, 1924.

230,447. Concentrated acetic acid from dilute acetic acid, Process for the recovery of. H. Suida. March 8, 1924.

234,434. Decarbonisation of cast iron or other metals, Process for. P. J. Martin and G. F. Bertels. May 23, 1924.

237,937. Nitric acid, Recovery and concentration of. Nobel's Explosives Co., Ltd., J. W. McDavid, and E. Williams. February 11, 1924.

237,939. Extracting metals from ores and other metallurgical products, Process for. C. Hennes. March 5, 1924.

237,943. Dyeing or colouring of products made with cellulose acetate. British Celanese, Ltd. and G. H. Ellis. April 4, 1924.

238,033. Oxidation of alcohols and aldehydes. E. B. Maxted and B. E. Coke. June 4, 1924.

238,047. Continuous chlorination of cellulosic materials by means of chlorine solutions. A. R. de Vains. June 28, 1924.

238,072. Utilising vitriolic sludges obtained from the refining of hydrocarbons, Method of. M. B. Trepel. July 30, 1924.

238,158. Classification and concentration of ore bearing material. A. R. Brown. April 22, 1925.

238,166. Separating gas mixtures, more particularly air or other difficultly liquefiable gases, Process for. R. F. Mewes and R. K. E. Mewes. February 4, 1924.

237,964. Reduction of ores. W. H. Beasley, A. B. Middleton, and Metals Production, Ltd. May 1, 1924.

Applications for Patents

Akt. Ges. für Anilin Fabrikation. Manufacture of sulphocyano derivatives. 20,729. August 18. (Germany, September 24, 1924.)

Amann, A., and Chemische Fabrik Dr. K. Albert Ges. Method of making condensation products from mono- and dicyclic phenols and aldehydes. 20,791. August 19.

Bensa, F. Manufacture of vat dyes. 21,091. August 22.

Bentley, W. H. Manufacture of sulphur. 20,580. August 17.

Buhler, A., Buhler Bros., Buhler, O., and Buhler, W. Mills for grinding paint, etc. 20,716. August 18.

Chemische Fabrik auf Actien vorm. E. Schering. Manufacture of silica gel. 20,620. August 17. (Germany, November 3, 1924.)

Cross, C. F. Manufacture of cellulose products. 20,988. August 21.

Drew, H. D. K. Preparation of aromatic derivatives of tellurium. 21,070. August 22.

Farbwerke vorm. Meister, Lucius and Brüning. Manufacture of derivatives of benzanthrones. 20,633. August 17. (Germany, August 15, 1924.)

Fonrobert, E. Method of making condensation products from mono- and dicyclic phenols and aldehydes. 20,791. August 19.

Garrett, W. H., and Graesser Monsanto Chemical Works, Ltd. Production of naphthalene. 20,581. August 17.

Grasselli Chemical Co. Manufacture of sulphuric acid. 20,809. August 19. (United States, October 4, 1924.)

Greaves, R. Means for preventing corrosion, etc., of boilers, etc. 20,943. August 21.

Halden, C. Ab-der-. Continuous distillation of tar, etc. 21,003. August 21. (France, September 13, 1924.)

Henkel et Cie, Ges. Manufacture of dry halogen-calcium starch preparations. 20,923. August 20. (Germany, December 16, 1924.)

Metallbank und Metallurgische Ges. Akt.-Ges. Production of active carbon. 20,896. August 20. (Germany, August 20, 1924.)

Mexco, Ltd. Explosives. 20,842. August 19.

Morgan, G. T. Preparation of aromatic derivatives of tellurium. 21,070. August 22.

Riley and Sons, Ltd., J. Manufacture of sulphur. 20,580. August 17.

Tyrer, D. Manufacture of hydrochloric acid. 20,822. August 19.

Viscose Development Co., Ltd. Manufacture of cellulose products. 20,988. August 21.

Waring, H. Manufacture of white lead. 20,870. August 20.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, August 28, 1925.

THE market this week has proceeded along quietly steady lines, and there is little of interest to report. The improved tone noted in our last issue continues, and prices in the main continue firm.

Export trade is slowly broadening, but a good deal more business could be accommodated.

General Chemicals

ACETONE.—Market is firm and price standing between £76 to £77 per ton.

ACID ACETIC has been fairly well called for, and the price is unchanged for 80% technical, with £1 per ton extra for the pure.

ACID CITRIC.—This market is still in buyers' favour and price is quoted at 1s. 3½d. per lb. ex store.

ACID FORMIC has been in moderate demand, and price is unchanged at £48 to £49 per ton for 85% technical.

ACID LACTIC is quiet with the price unchanged at £43 to £44 per ton for 50% by weight material.

ACID OXALIC.—The demand has broadened, and the price is very steady at 3¾d. per lb.

ACID TARTARIC is inclined to be quiet, and price is quoted at 11¼d. to 11½d. per lb.

ALUMINA SULPHATE is only in poor inquiry with price inclined to be slightly easier, and is now quoted at £6 2s. 6d. per ton.

ARSENIC is featureless and in buyers' favour at £21 per ton.

BARIUM CHLORIDE continues in brisk demand for prompt delivery, and price may be stated as £9 per ton.

CREAM OF TARTAR continues fairly active and is quoted at £74 to £77 per ton.

EPSOM SALTS are firm, and commercial is quoted at £5 per ton for imported material.

FORMALDEHYDE continues its firmer position, and is quoted at £41 to £41 10s. per ton, but a small advance is not unlikely here.

LEAD ACETATE is very brisk and firm at £45 10s. for white, and £43 per ton for brown.

LIME ACETATE is fairly active and is quoted at £15 10s. for grey.

METHYL ACETONE continues idle and price is nominally £48 per ton.

POTASSIUM CAUSTIC is unchanged.

POTASSIUM CHLORATE.—Market is extremely firm and price is to-day about 4d. per lb.

POTASSIUM PERMANGANATE moves steadily into consumption, but the value is unchanged at 7¾d. per lb.

POTASSIUM PRUSSIATE continues firm, and some substantial forward business has been fixed, the market price to-day is 7½d. to 7¾d. per lb.

SODIUM ACETATE continues easy, and the average price is about £18 per ton delivered, buyers' works.

SODIUM BICHROMATE is unchanged at British makers' figures.

SODIUM HYPOSULPHITE.—The photographic quality is still in demand, but commercial only meets with a poor inquiry, price unchanged.

SODIUM PRUSSIATE is firm at 4½d. per lb.

SODIUM NITRITE meets with a fair inquiry and is quoted at £22 10s. per ton.

SODIUM SULPHIDE is unchanged at British makers' figures.

ZINC SULPHATE is in good demand with price firm at £13 per ton.

Coal Tar Products

There is no change to report in the market for coal tar products from last week.

90% BENZOL remains firm, at 1s. 9d. to 1s. 10d. per gallon on rails.

PURE BENZOL is steady at 1s. 11d. to 2s. per gallon on rails.

CREOSOTE OIL is firm at 5¾d. per gallon on rails in the North, and 7d. to 7¼d. per gallon in the South.

CRESYLIC ACID remains quiet, and is quoted at 1s. 7d. to 1s. 8d. per gallon on rails for the pale quality 97/99%, while the dark 95/97% quality is quoted at 1s. 4d. per gallon on rails.

SOLVENT NAPHTHA is steady, and is quoted at 1s. 4d. to 1s. 5d. per gallon on rails.

HEAVY NAPHTHA can be bought at 1s. 1d. per gallon on rails.

NAPHTHALENES are unchanged, the lower grades being worth from £3 to £3 15s. per ton, while the 74/76 quality is quoted at £5 to £5 10s. per ton, and the 76/78 quality at £5 15s. to £6 per ton.

PITCH remains quiet, and there is no sign of improvement in the demand. Prices are unchanged at 40s. to 42s. 6d. per ton f.o.b. main ports.

Latest Oil Prices

LONDON.—LINSEED OIL closed steady at 5s. to 10s. advance, Spot, £40 15s.; August to December, £40; January-April. £39 15s. RAPE OIL quiet. Crude crushed, spot, £49; technical, refined, £52. COTTON OIL quiet. Refined common edible, £50; Egyptian, crude, £44 10s.; deodorised, £52. TURPENTINE steady. American, spot, 70s.; September-December, 71s., and January-April, 73s. 3d. per cwt.

HULL.—LINSEED OIL.—Naked, spot, to September-December, £40; January-April, £39 15s. COTTON OIL.—Naked Bombay, crude, £40 10s.; Egyptian, crude, £43; edible, refined, £47; deodorised, £49; technical, £43 10s. PALM KERNEL OIL.—Crushed, naked, 5½ per cent., £42 10s. GROUNDNUT OIL, crushed-extracted, £48 10s.; deodorised, £52 10s. SOYA OIL.—Extracted and crushed, £42 5s.; deodorised, £45 15s. RAPE OIL extracted, £48 10s. per ton, net cash terms, ex mills. CASTOR OIL and COD OIL unchanged.

Nitrogen Products Market

Export.—During the last week the demand for export has continued steadily and considerable sales have been made to the Continent, to the Far East and to the West Indies. British prices for prompt shipment have now been raised to £11 15s. per ton for September/October f.o.b. U.K. port in single bags.

Home prices have been previously announced. Sales are small, as is usual for this period of the year. Up to the time of going to press the British home sales are about 13,000 tons in excess of those of the same period last year.

Nitrate of Soda.—The nitrate market continues steady, though little business is being done except resale business for forward positions. Cargoes c.i.f. chief European ports are being offered at £11 5s. per ton, but buyers are resisting this price and bidding no more than £11.

American Market Movements

(From *Drug and Chemical Market*)

Essential oils are very strong and the pressure is upward on prices. Levels are now highest since 1920. Peppermint is uncertain, but no open break in price is reported as yet.

A much firmer tone is coming in evidence in pharmaceutical chemicals with buyers looking around for their fall supplies. Prices are stronger but unchanged in most instances.

Increased demand reported in industrial chemicals. Formic acid shaded again. Copper sulphate higher. Arsenic and barium salts remain at low prices. Sal ammoniac higher. Intermediates moving in a routine way at unchanged prices. Benzene quoted at varying prices due to heavy demand for motor fuel. Pyridine firm on spot but shipment is lower. Naphthalene, cresylic acid and phenol are dull.

New Italian Celluloid Factory

CELLULOID is to be produced at the rate of 2,000 kilos per day at the newly-completed plant of the Societa Italiana della Celluloide, Gournate Superiore, Italy.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£20 per ton.
Acid Boric, Commercial.—Crystal, £40 per ton, Powder, £42 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations : 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d ; Contract, £9 10s. d/d. 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chlorate (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d.
Nickel Ammonia Sulphate.—£38 per ton d/d.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5d. per lb.
Potassium Chlorate.—3¾d. per lb., ex wharf, London, in cwt. kegs.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength ; 20s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£21 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4d. per lb.
Sodium Bisulphite Powder 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.
Sodium Chlorate.—3d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Phosphate, £14 per ton, f.o.r. London, casks free.
Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.
Sodium Sulphide conc. solid. 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. pd.
Sodium Sulphide Crystals.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. pd.
Sodium Sulphite, Pea Crystals.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—4⅝d. per lb. Slightly better demand. Crude 60's, 1s. 2d. to 1s. 3d. Little demand.
Acid Cresylic 97/99.—1s. 6d. to 1s. 9d. per gall. Pale, 95%, 1s. 5d. to 1s. 6d. per gall. Dark, 1s. 5d. per gall. Better demand.
Anthracene Paste 40%.—3d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—7¾d. per gall. Unstrained, 7d. per gall. Nominal.
Benzol.—Crude 65's.—11d. to 1s. 3d. per gall., ex works in tank wagons. Standard Motor, 1s. 8d. to 1s. 10d. per gall., ex works in tank wagons. Pure, 1s. 9½d. to 2s. per gall., ex works in tank wagons.
Toluol.—90%, 1s. 8½d. to 1s. 9d. per gall. More inquiry. Pure, 1s. 9½d. to 2s. 2d. per gall.
Xylol Commercial.—1s. 9½d. to 2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 8½d. per gall. Standard specification, middle oil, heavy, 6d. to 6¾d. per gall. Steady demand for near delivery.
Naphtha.—Solvent 90/160, 1s. 5d. to 1s. 9d. per gall. Demand good. Solvent 90/190, 1s. to 1s. 4d. per gall. Fair demand.
Naphthalene Crude.—Drained Creosote Salts, £3 to £5 per ton. Market quiet. Whizzed or hot pressed. No demand.
Naphthalene.—Crystals and Flaked, £10 to £13 per ton, according to districts. Very quiet.
Pitch.—Medium soft, 40s. to 42s. 6d. per ton, according to district. Better inquiry.
Pyridine.—90/160, 19s. 6d. to 20s. per gall. Heavy, 11s. 6d. to 12s. per gall. Fair business.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid Anthranilic 7s. per lb. 100%.
Acid Benzoic 1s. 9d. per lb.
Acid H.—3s. 6d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—4s. 10d. per lb. 100% basis d/d.
Acid Sulphanilic.—9d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—7d. to 7½d. per lb. naked at works.
Aniline Salts.—7d. to 8d. per lb. naked at works.
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—3s. 6d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 29/31° C.—3d. per lb. Demand quiet.
m-Cresol 98/100%.—2s. 1d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
Dimethylaniline.—2s. 1d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzene.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
a-Naphthol.—1s. 10d. per lb. d/d. Fair home inquiry.
B-Naphthol.—1s. per lb. d/d. Fair home inquiry.
a-Naphthylamine.—1s. 3d. per lb. d/d. Fair home inquiry.
B-Naphthylamine.—3s. 9d. per lb. d/d.
m-Nitraniline.—3s. 9d. per lb. d/d.
p-Nitraniline.—1s. 11d. per lb. d/d.
Nitrobenzene.—5¼d. to 5½d. per lb. naked at works. Good home inquiry.
o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronaphthalene.—10d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—9s. 9d. per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.
o-Toluidine.—10d. per lb.
p-Toluidine.—2s. 3d. per lb. naked at works.
m-Toluylene Diamine.—4s. per lb. d/d.

Wood Distillation Products

Acetate of Lime.—Brown £9 10s. to £10. Quiet market. Grey, £15 per ton. Liquor, 9d. per gall. 32° Tw.
Acetone.—£73 per ton.
Charcoal.—£7 5s. to £8 10s. per ton, according to grade and locality.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall, 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 9d. per gall. Unrefined.
Wood Naphtha, Miscible.—4s. 3d. per gall.
60% O.P. Solvent, 4s. 6d. per gall. 40% O.P.
Wood Tar.—£4 per ton.
Brown Sugar of Lead.—£43 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 7½d. to 1s. 5d. per lb., according to quality, Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality.
Arsenic Sulphide, Yellow.—2s. per lb.
Barytes.—£3 10s. to £6 15s. per ton, according to quality.
Cadmium Sulphide.—4s. 4d. per lb.
Carbon Bisulphide.—£25 to £28 per ton, according to quantity.
Carbon Black.—5½d. per lb., ex wharf.
Carbon Tetrachloride.—£55 to £60 per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 3d. per lb.
Diphenylguanidine, 4s. to 4s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—5¾d. to 6¾d. per lb.
Lamp Black.—£43 per ton, barrels free.
Lead Hyposulphite.—9d. per lb.
Lithopone, 30%.—£22 10s. per ton.
Mineral Rubber "Rubpron."—£13 12s. 6d. per ton f.o.r. London.
Sulphur.—£9 to £11 per ton, according to quality.

Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£50 to £55 per ton.
Thiocarbamide.—2s. 6d. to 2s. 9d. per lb.
Thiocarbanilide.—2s. 1d. to 2s. 3d. per lb.
Vermilion, Pale or Deep.—5s. per lb.
Zinc Sulphide.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic, 80 % B.P.—£39 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 6½d. to 2s. 8d. per lb. British makers meeting foreign competition in quality and price.
Acid, Benzoic B.P.—2s. to 2s. 3d. per lb., according to quantity.
Acid, Boric B.P.—Crystal £46 per ton, Powder £50 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 3d. to 1s. 4d. per lb., less 5%. Weak.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots.
Acid, Pyrogallic, Crystals.—5s. 4d. to 5s. 6d. per lb.
Acid, Salicylic.—1s. 3d. to 1s. 4d. per lb. Low price due to competition. Technical.—10½d. to 11d. per lb.
Acid, Tannic B.P.—2s. 8d. per lb.
Acid, Tartaric.—1s. 0¾d. per lb.
Amidol.—9s. per lb., d/d.
Acetanilide.—1s. 5d. per lb. for quantities.
Amidopyrin.—13s. 3d. per lb.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—11s. 6d. per oz. for English make.
Barbitone.—10s. 3d. to 10s. 6d. per lb. Lower owing to increased supplies.
Benzonaphthol.—3s. 6d. per lb. spot.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb.
according to quantity.
(Prices advanced. Supplies of the metal much easier.)
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 1s. 11d. to 2s. per lb.; sodium, 2s. 1d. to 2s. 2d. per lb.; ammonium, 2s. 5d. to 2s. 6d. per lb., all spot. British or Imported. Firm.
Calcium Lactate.—1s. 4d. to 1s. 6d., according to quantity.
Chloral Hydrate.—3s. 5d. to 3s. 6d. per lb., duty paid.
Chloroform.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
Creosote Carbonate.—6s. 9d. per lb.
Formaldehyde.—£40 per ton, in barrels ex wharf.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 60%, 2s. 6d. per lb.
Guaiacol Carbonate.—6s. 2d. to 6s. 6d. per lb.
Hexamine.—2s. 2d. powder crystal, 2s. 6d. free running crystal, per lb.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon f.o.r. makers' works, naked.
Hydroquinone.—4s. 4½d. per lb., in cwt. lots.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 8d. to 1s. 11d. per lb. Green, 2s. 2d. to 2s. 7d. per lb. U.S.P., 1s. 7d. to 1s. 10d. per lb.
Magnesium Carbonate.—Light Commercial, £34 per ton net. Light pure, £46 per ton.
Magnesium Oxide.—Light Commercial, £65 per ton, less 2½%, price reduced; Heavy Commercial, reduced to £24 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 46s. 6d. per lb., less 2½% prompt delivery. Synthetic, 22s. 6d. to 27s. 6d. per lb., according to quality. English make.
Mercurials.—Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb. Still quiet.
Methyl Salicylate.—1s. 4½d. to 1s. 8d. per lb. British cheaper than imported.
Methyl Sulphonal.—16s. 9d. to 17s. per lb. Demand limited.
Metol.—11s. per lb. British make.
Paraformaldehyde.—2s. for B.P. quality.
Paraldehyde.—1s. 2d. to 1s. 4d. per lb., in free bottles and cases.
Phenacetin.—4s. to 4s. 3d. per lb.
Phenazone.—6s. to 6s. 3d. per lb. Spot lower than forward price.
Phenolphthalein.—4s. to 4s. 3d. per lb. Supply exceeds demand.
Potassium Bitartrate 99/100% (Cream of Tartar).—78s. per cwt., less 2½% for ton lots.
Potassium Citrate.—1s. 7d. to 1s. 10d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Steady market.
Potassium Metabisulphite.—6d. to 9d. per lb., 1-cwt. kegs included, f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7¾d. per lb., spot. Firmer.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—3s. 10½d. per lb. In fair quantities.
Saccharin.—63s. per lb. in 50 lb. lots.
Salol.—3s. 3d. to 3s. 6d. per lb.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb.
Sodium Citrate, B.P.C., 1911.—1s. 4d. to 1s. 7d. per lb., B.P.C., 1923. 1s. 7d. to 1s. 8d. per lb., according to quantity. U.S.P., 1s. 7d. to 1s. 10d. per lb.
Sodium Hyposulphite, Photographic.—£14 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—80s. per cwt., for ton lots and upwards.
Sodium Salicylate.—Powder, 1s. 10d. to 2s. per lb. Crystal, 1s. 11d. to 2s. 1d. per lb. Flake, 2s. 1d. to 2s. 4d. per lb. Heavy demand due to cut prices.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
Sulphonal.—12s. 3d. to 12s. 6d. per lb. Limited demand.
Thymol.—11s. to 15s. per lb.

Perfumery Chemicals

Acetophenone.—9s. per lb.
Aubepine (ex Anethol).—10s. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 1½d. per lb.
Anethol (M.P. 21/22° C.).—5s. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 4d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 4d. per lb.
Benzaldehyde free from Chlorine.—2s. 9d. per lb.
Benzyl Benzoate.—2s. 9d. per lb.
Cinnamic Aldehyde Natural—15s. 6d. per lb.
Coumarin.—13s. per lb.
Citronellol.—19s. per lb.
Citral.—9s. per lb.
Ethyl Cinnamate.—9s. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—9s. 6d. per lb.
Geraniol (Palmarosa).—27s. per lb.
Geraniol.—8s. to 16s. per lb.
Heliotropine.—6s. 3d. per lb.
Iso Eugenol.—14s. 6d. per lb.
Linalol ex Bois de Rose.—19s. 6d. per lb.
Linalyl Acetate.—18s. 6d. per lb.
Methyl Anthranilate.—9s. 3d. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ambrette.—50s. per lb.
Musk Ketone.—33s. 6d. per lb.
Musk Xylol.—8s. 3d. per lb.
Nerolin.—4s. per lb.
Phenyl Ethyl Acetate.—14s. per lb.
Phenyl Ethyl Alcohol.—12s. per lb.
Rhodinol.—36s. 6d. per lb.
Safrol.—1s. 8d. per lb.
Terpineol.—1s. 9½d. per lb.
Vanillin.—22s. 9d. per lb.

Essential Oils

Almond Oil.—12s. 6d. per lb.
Anise Oil.—3s. 6d. per lb.
Bergamot Oil.—22s. per lb.
Bourbon Geranium Oil.—16s. 6d. per lb.
Camphor Oil.—60s. per cwt.
Cananga Oil, Java.—11s. 3d. per lb.
Cinnamon Oil, Leaf.—5d. per oz.
Cassia Oil, 80/85%.—9s. per lb.
Citronella Oil.—Java, 85/90%, 3s. 8d.; Ceylon, 2s. 6d. per lb.
Clove Oil.—7s. 6d. per lb.
Eucalyptus Oil, 70/75%.—1s. 9½d. per lb.
Lavender Oil.—French 38/40% Esters, 27s. per lb.
Lemon Oil.—6s. per lb.
Lemongrass Oil.—4s. 6d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.
Otto of Rose Oil.—Bulgarian, 60s. per oz. Anatolian, 35s. per oz.
Palma Rosa Oil.—13s. 9d. per lb.
Palma Rose Oil.—15s. 3d. per lb.
Peppermint Oil.—Wayne County. No good quality material available. Japanese, 20s. 6d. per lb. Much firmer.
Petitgrain Oil.—9d. per lb.
Sandal Wood Oil.—Mysore, 26s. per lb. Australian, 18s. 6d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, August 28, 1925.

IN the heavy chemical market business remains rather quiet, although inquiry for export has been a little better than for some time past. Prices of home manufactured products remain steady, with one or two advances in Continental offers.

Industrial Chemicals

ACID ACETIC.—In moderate request and price unchanged. 98/100% glacial, £56 to £67 per ton according to quality and packing, c.i.f. U.K. ports. 80% pure, £40 to £42 per ton. 80% technical, £39 to £41 per ton packed in casks c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated, or small flaked, £40 per ton. Powdered, £42 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—In good demand and price unchanged at 4½d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Rather cheaper. Spot material now available at about 1s. 4d. per lb., less 5% ex store. Offered for early delivery at a fraction less.

ACID FORMIC, 85%.—Quote £47 10s. per ton, c.i.f. U.K. ports. Spot material available at about £48 10s. per ton, ex store.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80°.—Usual steady demand, quoted £23 15s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Unchanged at about 3½d. per lb., ex wharf. Offered for forward delivery at slightly less.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Quote 11½d. per lb., less 5%, ex wharf. Spot material available at about 11¾d. per lb., less 5%, ex store.

ALUMINA SULPHATE, 17/18% IRON FREE.—Quoted £6 15s. per ton, ex store, spot delivery. Offered for prompt shipment from the Continent at £6 5s. per ton, c.i.f. U.K. ports.

ALUM, LUMP POTASH.—Quoted £9 5s. per ton, ex store, spot delivery. On offer for prompt shipment from the Continent at about £8 per ton, c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—Moderate demand and price unchanged at 1s. 4½d. per lb., less 5 %, ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton. Powdered, £39 per ton. Packed in 5 cwt. casks delivered U.K. ports.

AMMONIA LIQUID, 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' cyrstals quoted £28 per ton, ex station. Offered from the continent at about £24 per ton, c.i.f. U.K. ports. Fine white crystals quoted £19 10s. per ton, c.i.f. U.K. ports.

ARSENIC.—Refined white Cornish now on offer at £25 per ton, ex store, spot delivery. To come forward about £24 per ton, ex wharf. Foreign arsenic quoted £21 per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE.—98/100%. Large crystals quoted £8 5s. per ton, c.i.f. U.K. ports. Spot material available at about £9 10s. per ton, ex store.

BLEACHING POWDER.—Spot lots English material, £10 10s. per ton, ex station. Contracts 20s. per ton less. On offer from the Continent at about £8 7s. 6d. per ton c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £24 10s. per ton; crystals, £25 per ton; powdered £26 per ton. Carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, carriage paid U.K. stations. Continental on offer at about £4 2s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Now quoted £3 10s. per ton, ex wharf, packed in casks.

COPPER SULPHATE.—Offered from the continent at about £21 15s. per ton, c.i.f. U.K. ports. English material for export unchanged at about £24 10s. per ton, f.o.b.

FORMALDEHYDE 40%.—Spot material quoted £39 10s. per ton, ex store. Offered for forward delivery at about £39 per ton c.i.f. U.K. ports.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 17s. 6d. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material fairly steady at £44 per ton, ex store. Offered for forward delivery at about £43 per ton c.i.f. U.K. ports.

LEAD, WHITE.—Quoted £44 per ton ex store, spot delivery, for imported dry material.

LEAD ACETATE.—White Crystals quoted £44 10s. per ton spot delivery. Brown, £43 per ton, ex store. White Crystals on offer from the Continent at £43 15s. per ton c.i.f. U.K. ports. Brown about £38 per ton c.i.f. U.K. ports.

MAGNESITE, GROUND CALCINED.—Now quoted £8 15s. per ton, ex station.

POTASH CAUSTIC 88/92%.—Offered for prompt shipment at about £28 5s. per ton, ex wharf. Spot material quoted at about £30 per ton, ex store.

POTASSIUM BICHROMATE.—Price for home consumption 5d. per lb delivered.

POTASSIUM CARBONATE, 96/98%.—Quoted £25 5s. per ton c.i.f, U.K. ports. Spot material available at about £26 5s. per ton. ex store.

POTASSIUM CHLORATE, 99/100%.—Limited quantities available at about £32 10s. per ton c.i.f. U.K. ports.

POTASSIUM NITRATE, SALTPETRE.—99% Refined Granulated quoted at about £24 10s. per ton c.i.f. U.K. ports. Spot material quoted £27 per ton ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Unchanged at about 7¾d. per lb. ex store. Offered for early delivery at 7¾d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—In moderate demand. Now quoted 7½d. per lb., ex store. Offered for prompt shipment from the Continent at a fraction less.

SODA CAUSTIC 76/77% £18 per ton. 70/72% £16 12s. 6d. per ton. Broken 60% £17 2s. 6d. per ton. Powdered 98/99% £21 7s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Rather cheaper at about £18 15s. per ton, ex store, spot delivery. Quoted £17 5s. per ton c.i.f. U.K. ports to come forward from the Continent.

SODIUM BICARBONATE.—Refined re-crystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM CARBONATE.—Soda Crystals, £5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, £1 7s. 6d. per ton more. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material unchanged at £9 10s. per ton, ex station, minimum 4-ton lots. Pea Crystals, £14 per ton, ex station. Continental offers are higher at about £9 10s. per ton, ex wharf.

SODIUM NITRATE.—Quoted £13 per ton, ex store. 96/98% refined quality 7s. 6d. per ton extra.

SODIUM NITRATE 100%.—Quoted £24 per ton, ex store. Offered from the Continent at about £22 5s. per ton c.i.f. U.K. ports.

SODIUM PRUSSIATE, YELLOW.—Rather better inquiry. Now quoted 4¼d. per lb., ex store.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption £3 10s. per ton f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English material. Solid 60/62% now £13 per ton. Broken, £14 per ton. Flake, £15 per ton. Crystals, £8 10s. per ton. Carriage paid U.K. stations, minimum 4-ton lots, with slight reductions for contracts to the end of the year. 60/62% Solid offered from the Continent at £10 15s. per ton c.i.f. U.K. ports. Broken, £1 per ton more. 30/32% Crystals, £7 15s. per ton c.i.f. U.K. ports.

SULPHUR.—Flowers, £10 10s.; Roll, £9 10s.; Rock, £9 7s. 6d.; Ground, £9 10s., per ton, ex store, spot delivery. Prices nominal.

ZINC CHLORIDE 98/100%.—Quoted from the Continent at £24 5s. per ton c.i.f. U.K. ports. 97/98% of English manufacture on offer at £25 per ton. f.o.b. U.K. ports.

ZINC SULPHATE.—Commercial crystals on offer from the Continent at about £12 per ton c.i.f. U.K. ports.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

N.W. ACID.—4s. 10d. per lb. per 100%. Fair home inquiries.

TOLUIDINE MIXED.—1s. 6d. per lb. Fair home inquiries.

BETA NAPHTHOL.—1s. per lb. Some home inquiries.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, August 28, 1925.

Not much increase in the amount of business put through on the Manchester chemical market this week can be recorded. One or two firms report a slight improvement, but this is not by any means general. Home demand is still restricted, and is regulated largely by the state of affairs in the consuming industries. Most of the orders being booked now are for early delivery. Inquiry for export is relatively small, most of the demand coming from the Dominions and the East. In some sections of the market, prices are showing a slightly weaker tendency, but in other directions there has been added firmness.

Heavy Chemicals

Bicarbonate of soda meets with a rather slow demand, but there is no change in price, £10 10s. per ton still being quoted. Soda crystals are held at about £5 5s. per ton, and a fair amount of business is being done. Glauber salts are unchanged at £3 10s. per ton, but the demand for this material is slow. Saltcake is also quiet at round £3 12s. 6d. per ton. Sodium sulphide is rather inactive and prices are easy; 60–65 per cent. concentrated solid is on offer at about £12 5s. per ton, and commercial quality at £9 5s. Caustic soda is well maintained and is selling in fair quantities at from £15 12s. 6d. per ton for 60 per cent. material to £18 for 76–77 per cent. Prussiate of soda is rather quiet, but values are steady at 4d. per lb. Quotations for hyposulphite of soda are firm, and a fair demand is being met with; commercial quality is offering at about £9 per ton, and photographic crystals at £14 10s. to £15. Phosphate of soda is quiet but about unchanged from last week at £12 10s. to £12 15s. per ton. Bleaching powder is in quiet demand at £9 10s. per ton. Alkali is steady at £6 15s. per ton, and a fair business is being done. Acetate of soda, though easy, is still quoted at about £18 per ton, but the demand for this material is rather slow. Chlorate of soda is steady and in moderate request at 2¾d. to 3d. per lb.

Both caustic potash and carbonate of potash are maintained, though in neither case is the demand very pressing. Caustic is quoted at round £29 per ton, and carbonate at £25 10s. for 96–98 per cent. material. Prussiate of potash meets with only a moderate amount of inquiry, with values unchanged at 7d. to 7¼d per lb. Permanganate of potash is steady though sales are slow; commercial is on offer at round 6d. per lb., and B.P. quality at 7¾d. to 8d. Chlorate of potash is still quoted at 3⅞d. per lb. Bichromate of potash is steady at 5d. per lb., but business is on a rather restricted scale.

Arsenic is still an inactive section of the market, and prices are easy though not quotable changed from last report; white powdered, Cornish makes, is offered in Cornwall at round £20 per ton, and in Manchester at about £24. Sulphate of copper keeps quiet, though unchanged in price at round £24 10s. per ton. Nitrate of lead is in fair request, and values keep steady at £40 to £41 per ton. Acetate of lead is in quiet demand with prices firm at £44 to £45 per ton for white, and £39 to £40 for brown. Acetate of lime is on offer at £14 5s. for grey material, and £7 15s. to £8 for brown, but the demand is on small lines. Commercial Epsom salts are selling slowly and prices are easier at round £3 15s. per ton; magnesium sulphate, pharmaceutical quality, is quoted at £5 5s. to £5 10s. per ton.

Acids and Coal Tar Products

In the acid section the demand for most lines is rather inactive. Oxalic acid is dull and easy at about 3½d. per lb. Tartaric acid is quiet at 11¾d. to 1s. per lb. Citric acid is unchanged at about 1s. 4d. per lb. Acetic acid is in moderate request at about £38 per ton for 80 per cent. commercial quality and £67 for glacial.

Among coal-tar products, carbolic acid is slightly more active and values are steadier, with crystal quoted at 4¾d. to 5d. per lb. and crude at 1s. 4½d. per gallon. Pitch still attracts little attention at the more or less nominal price of 40s. per ton. Solvent naphtha is in limited request at round 1s. 5d. per gallon. Naphthalene is quiet and easy at about £13 5s. per ton for refined, and from £4 5s. for crude qualities. Creosote oil is about unchanged from last week at 5¾d. to 6d. per gallon.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Insulating Varnishes.—A manufacturers' agent in Montreal desires to represent British manufacturers of insulating varnishes and enamels. (Reference No. 207.)

Red Oxides, Ochres and Ceramic Enamel Colours.—A Montreal company asks to be placed in correspondence with British buyers of the above lines. Replies should be addressed to the Trade Commissioner, Canadian Building, Trafalgar Square, London, S.W.1.

Anti-Friction Grease.—The Administration of the South African Railways and Harbours is inviting tenders to be presented in South Africa by October 22 for the supply at various points of approximately 32½ tons (2,000 lb. each) of anti-friction grease. (Reference No. B.X. 1985.)

Dry Colours.—A manufacturers' agent in Toronto desires to represent British manufacturers of dry colours for the province of Ontario. (Reference No. 235.)

Soap.—Tenders invited for the supply of 1 ton of yellow soap, to Stratford-on-Avon Guardians, Union Offices, by September 3.

Oils, Paints, etc.—Tenders invited for supply of paints, oils, cement, lime, glass, tar, macadam, for Swansea Town Council. Tenders to Town Clerk by September 3.

Tariff Changes

Union of South Africa.—Preferential rates for U.K. products and manufactures include:—White lead, dry, maximum duty 7s. per 100 (rebate 1s. per 100 lb.); ground in oil (in packages of 50 lb. weight or over), 10s. per 100 lb. (rebate 1s. per 100 lb.); (in packages of less than 50 lb.) 11s. per 100 lb. (rebate 1s.).

Barbados.—Cotton oil seed is now rated at 7s. 6d. per ton ad valorem for British Preferential Tariff, and 15s. per ton General Tariff. Plant for sugar or rum manufacture, for working petroleum, asphalte or other minerals, and cotton seed machinery are all duty free.

Italy.—The sales tax on benzine is reduced from 60 to 30 lire per 100 kilogs. Petroleum for use in agricultural motors is duty free and exempt from sales tax.

Poland.—Sugar beet, molasses, fuel, artificial fodder, copper, nickel, aluminium, brass, phosphor bronze, are now exempt from export duty.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to September 26, 1925.

"Imunol."

459,349. For chemical substances used in manufactures, photography or philosophical research and anti-corrosives. Paul Lechler, Kronenstrasse 50, Stuttgart, Germany; manufacturer. May 28, 1925.

"Vaprust."

460,729. For compounds for preventing rust on metals. Thomas Johnson, 8, Fitzwilliam Street, Doncaster, Yorkshire; electro plater. July 17, 1925.

"Prufitol."

460,778. For chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. Rogers, Welch and Co., Ltd., Phipps Bridge, Merton, London, S.W.19; manufacturers. July 18, 1925.

"Bistovol."

460,757. For chemical substances prepared for use in medicine and pharmacy. May and Baker, Ltd., Garden Wharf, Church Road, Battersea, London, S.W.11; manufacturing chemists. July 17, 1925.

Company News

DOMINION GLASS CO.—A dividend of $1¾ on the common and preferred stocks is payable on October 1.

A NEW RAYON PLANT to be erected by the American Bemberg Co. in Tennessee will employ 10,000 workers.

MR. C. F. RATCLIFFE, managing director of Brotherton and Co., Ltd., leaves on September 19 for an extensive tour in Canada and the United States.

THE RETIREMENT IS ANNOUNCED of Mr. T. Buxton, Canadian manager of the British Dyestuffs Corporation, Ltd. Mr. W. H. Hampshire is to succeed him.

AN INCREASE in the duty on imported sodium silicofluoride is being asked for by various U.S. firms, who state that they cannot compete with foreign competition.

JOHN OAKEY AND SONS.—The directors have declared an interim dividend on the ordinary shares for the half-year ended June 30 last, at 2½ per cent., less tax, payable on September 1.

ENGLISH CHINA CLAYS, LTD.—An interim dividend is announced on the ordinary shares at the rate of 4 per cent. per annum for the half-year ended June 30 last, to be paid on October 1 to ordinary shareholders registered on September 17.

STAVELEY COAL AND IRON CO., LTD.—A final dividend of 1s. per share is recommended on the fully-paid shares, 9d. per old share with 15s. paid up, and 3d. per new share with 15s. paid up, making 7½ per cent. for the year ended June 30 last.

SAN PATRICIO NITRATE CO.—At a meeting held on Monday it was agreed that the company should be wound up voluntarily and the shareholders were given the option of changing their shares for shares in the Santa Rita Co. or of selling their present holdings for 7s. 6d. per share.

PINCHIN, JOHNSON AND CO., LTD.—In view of the very satisfactory trading results for the half-year ending June 30, the directors have resolved to declare an interim dividend of 10 per cent. actual on the ordinary shares, as compared with 8 per cent. actual for the corresponding period of 1924.

F. STEINER AND CO., LTD.—After deducting £64,879 for depreciation and repairs, etc., the profit for the year ended July 31 last amounts to £33,138, which, with £40,848 brought forward from last year and a transfer from the general reserve of £30,000, makes a total of £103,987. The directors recommend a dividend of 5 per cent. for the year on the ordinary shares, leaving a balance of £39,737 to be carried forward.

UNITED INDIGO AND CHEMICAL CO.—The report for the year to June 30 last, states that the net profits were £19,826, and £11,262 was brought forward. A final dividend of 5 per cent. is proposed on the ordinary shares, making 7½ per cent. for the twelve months. An extra dividend of 2½ per cent. will also be paid on the preference shares, making a total of 7½ per cent., and carrying forward £13,276. The company's net profits for 1923–24 were £36,918, and both classes of shares received 15 per cent.

BROKEN HILL PROPRIETARY CO.—The net profit for the year ended May 31 last was £372,307, comparing with £279,339 for the preceding year, after providing £213,518 for ordinary depreciation, against £156,154; and £75,000 for special depreciation, against £142,965. Re-assessments of taxation of past years have been made, and it has been possible to reduce the amount in sundry creditors. Book value of the Broken Hill Mine has been reduced by £75,000 as special depreciation, leaving this account at £183,405. Exclusive of shares in other companies, liquid assets stand at £1,040,120.

SANTA RITA NITRATE CO., LTD.—An extraordinary general meeting held on Monday unanimously approved the provisional agreement for the purchase of the undertaking and assets of the San Patricio Nitrate Co., with the exception of £5,000 cash, in consideration of the issue of Santa Rita shares of a nominal amount of £25,000 credited as fully paid. The directors were authorised to carry such agreement into effect, with such modifications as they might think necessary. A second resolution, giving authority to create £25,000 new shares of £1 each, ranking with the existing shares, was also carried unanimously.

MOND NICKEL CO., LTD.—A trust deed dated July 31, 1925, to secure £1,000,000 debenture stock has been registered. The property charged includes freehold lands and premises in Clydach, Birmingham, and East Acton, freehold and leasehold property at Llangefelach, and (as a floating security) the company's undertaking and property, present and future, including uncalled capital (all subject to £375,000 first mortgage debenture stock secured by a trust deed of October 21, 1924, and to £1,300,000 8 per cent. mortgage debenture stock secured by trust deeds dated April 1, 1921, and January 10, 1922). The trustees are the British Shareholders' Trust, Ltd., 3, Lombard Street, London, E.C.2.

BRITISH AND SOUTH PACIFIC TRADING CO.—Particulars of this company were announced this week, for information only, preparatory to the introduction of the shares on the market. The company was formed in 1922, has an issued share capital of £200,000 in £1 shares, and has devoted itself to building up the business of nitrate distributors in the principal consuming centres, and more particularly in those markets which, down to 1914, were to a large extent controlled by Hamburg firms. For the years to June 30, 1925 and 1924, the net profits, before meeting taxation, were £44,408 and £74,541 respectively, and for both years a dividend of 15 per cent. was paid. There is a reserve of £75,000. The company is financially interested in the American South Pacific Company, Inc., of New York, formed in September, 1924.

Continuous Filtration

AN interesting pamphlet giving the history of their automatic filter has been issued by the Oliver Continuous Filter Co., of 11-13, Southampton Row, London. Referring to the early history of the filtration process, it is claimed that the Oliver filter was the pioneer in the field of continuous filtration. Originally designed for the recovery of gold-silver solutions from ore slimes in the cyanide process, its use has rapidly extended to many other industries and more such filters are now used in each of several industries than in connection with the cyanide process. With the application of this filter to the different industries many new ideas and uses have been developed, and owing to the great range of products handled there is no rigid adherence to a single type of design, and modifications are made in the structure of filter drum, filter tank, agitator, and automatic valve in accordance with the requirements of each product.

In operating the Oliver filter, the material to be filtered is fed into the open filter tank in a steady stream. A homogeneous mixture is maintained by agitation, either mechanically or by the use of compressed air or steam. As the drum rotates the filtering surface is passed through every part of the agitated mass. Immediately each compartment under vacuum is immersed a cake begins to build and continues building to the point of emergence from the pulp. The liquid passes through the filter medium and the vacuum pipes to the automatic valve, while the solid particles adhere to the drum surface in a thin uniform cake. Immediately the solution disappears beneath the surface of the cake, the wash may be applied. This effects a thorough wash without mixing of solutions. The automatic valve can be adjusted so that one or more washes may be given and the filtrates kept separate. As the drum continues to rotate and a given compartment passes out of the wash zone, the vacuum is cut off, compressed air is automatically turned on by a different port in the valve, the cake is loosened and cleaned off by the scraper, and a clean filter surface passes forward to immersion and the commencement of a new cycle. The whole process is continuous and automatic and there is no break in the various stages of the cycle.

United Indigo and Chemical Co.

AT the annual meeting of the United Indigo and Chemical Co., Ltd., held at Manchester on Wednesday, the chairman, Mr. G. Heywood, referred to the very serious depression in the woollen and cotton industries, and said that during a visit to the American branch of the company in the spring of this year he found that in the American woollen industry there was a similar depression. Short time had been prevalent everywhere, and the almost unanimous demand for light colours meant a most important reduction in the weight of dyestuffs and chemicals required, but the directors hoped for an early improvement and a return to better trade. The trading profit for the year was £21,440, against £31,560 last year, but last year the trading profit was augmented by £4,775 previously reserved for excess profits duty. The report, which recommended a dividend of 7½ per cent., was adopted.

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Germany's Chemical Industry

Revival in the Potash Mines

A REVIEW of industrial conditions prevailing in Germany during July records a revival in the potash mines and also in the brewing industry. The position in the mining industries was worse in July and a catastrophe in the Ruhr can only be averted by speedy and comprehensive measures. Demands for potash fertilisers were satisfactory, with sales estimated at about 100,000 tons of K_2O. The petroleum industry was unsatisfactory.

There was no change of any importance in the situation in the chemical industry in July, but complaint was made of the increased difficulty of competition in the case of foreign deliveries. The margarine industry had no great demand owing to the hot weather. Raw material prices increased considerably, and cheap and medium quality products advanced. Trade in oil and seeds for the soap industry was good, but there was less demand for sweet oils and fats. Foreign oil seeds remained fairly steady.

Declining Position in Dyestuff Market

Mr. A. W. Kliefoth, United States Consul in Berlin, has compiled statistics relating to export of dyestuffs from Germany which indicate that the pre-war monopoly of that country in those commodities has been broken. Only 2,144 metric tons of dyestuffs left Germany during the first three months of 1925, compared with 31,594 metric tons in the first quarter of 1913. Thus the shipments in the 1925 period were only 6·7 per cent. of those of the 1913 quarter. The fundamental causes for the large decline of German dyestuffs exports are to be found in the steady development of the dyestuff industry in other countries, changed market conditions and the protective policies of many European nations who during the war were enabled to extend their own markets.

Before the war four-fifths of the German production, amounting to 80,000 metric tons, or 75 per cent. of the demand, was absorbed by the world market. Imports into Germany amounted to only 2,552 metric tons, of which 75 per cent. were from Switzerland. In 1914 the credit balance of German-European trade in dyestuffs was 67,000,000 marks. Since the war the German dye industry has lost 65 per cent. of its market in Western Europe, especially in Great Britain, France, and Belgium. The South-Eastern and Eastern European markets have improved, however, especially in Russia, Poland, Roumania, Finland, Bulgaria, and Greece, where German dyestuffs still hold a dominant position.

Russian Physico-Chemical Journal

IN reference to the journal of the Russian Physico-Chemical Society, noticed in a recent issue in its bearing on the state of Russian chemical studies, a Russian scientist resident in England, but familiar with conditions in his own country, writes:—

"It may interest your readers to know that of the total of 554 pages in the journal for 1924 (Vol. 55), 229 pages are devoted to summaries of Russian work already published during 1920-1921 in the *Berichte Compt Rendus* and to summaries on isotopes, adsorption, etc., of work not carried out in Russia. The remaining pages devoted to original work were received for publication before December, 1923. The journal is, therefore, no indication of the work done in Russia during 1924. In fact, I notice that the very interesting paper by Tanzoff on crystallisation was completed in 1919. The volume contains, however, one or two interesting papers, those, for example, by Nametkin on isomerism and by Kizner on the action of hydrazine on dimethyl-pyrone. On looking over the journal I was struck by the fact that the few interesting papers are by men who were known in 1914. The work of the new men certainly does not attain to the standard set by the younger chemists in other countries. I was also amused to find that titles have not been abolished by the Russian chemists. Thus, the "Proceedings" use freely "Academician," "Professor," "Doctor," and "Docent"; even "Docent-aspirant" is made use of. I notice that reference is made to the fact that the papers are communicated by Professor So-and so and Student So-and-so."

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

BOOTH, MR. T. A., Idle, Bradford, wholesale druggist (C.C., 29/8/25.) £10 1s. 1d. July 23.

SENIOR CROZIER AND CO., LTD., Union Works, Union Street, Stratford, chemical manufacturers. (C.C., 29/8/25.) £16 5s. 4d. April 29.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

CAVENDISH'S LTD., London, E.C., manufacturing chemists. (M., 29/8/25.) Registered August 11, £1,170 debenture, to Blue Bird Motor Co. (1924), Ltd., 25/31, Moorgate, E.C.; general charge. *Nil. May 15, 1925.

GWALIA PRODUCTS, LTD., Forestfach, manufacturers of fullers earth, etc. (M., 29/8/25.) Registered August 11, £600 debentures, to Branch Nominees, Ltd., 15, Bishopsgate, E.C.; charged on land at Forestfach, Swansea, etc., also general charge. *Nil. December 4, 1924.

OSMOS SALTS, LTD., Teddington. (M., 29/8/25.) Registered August 12, £2,000 debentures; charged on hereditaments, etc., at Fulwell Road, Teddington, also general charge. *Nil. December 23, 1924.

TAYLORS' DRUG CO., LTD., Leeds. (M., 29/8/25.) Registered August 17, £1,000 mortgage, to Mrs. S. Ashworth, c/o Armitage Speight and Ashworth, 5, Greek Street, Leeds; charged on The Pharmacy, Victoria Avenue, Blackley, Manchester. *£111,744 0s. 11d. September 12, 1924.

London Gazette, &c.

Companies Winding Up Voluntarily

METHLEY CHEMICAL CO., LTD. (C.W.U.V., 29/8/25.) T. A. Stoker, Incorporated Accountant, Pearl Chambers, East Parade, Leeds, appointed liquidator, August 15th.

RIDLEY AND WILLIAMSON CHEMICAL CO., LTD. (C.W.U.V., 29/8/25.) T. G. Cooke, Certified Accountant, 5, Essex Place, Rodney Road, Cheltenham, appointed liquidator, August 18.

RENNACID CASEIN, LTD.—Meeting of creditors at 22, Walbrook, London, E.C.4, on Tuesday, September 1, 1925, at 3 p.m.

New Companies Registered

ASBESTOS QUARRIES, LTD. To acquire any mines, quarries, mining rights and metalliferous land or oilfields in Europe or elsewhere; to crush, win, quarry, smelt, calcine, refine, etc., metal and mineral substances of all kinds, and to carry on the business of manufacturers of chemicals and manures, distillers, dye and gas makers, etc. Nominal capital, £1,000 in £1 shares. Solicitors: H. M. Meyler and Co., 8, Churton Street, Westminster, S.W.

E. C. WITTER AND CO., LTD., 19, Albert Grove, Longsight, Manchester. Manufacturers, importers and exporters of and dealers in glue, gelatines, size, grease, manures, hides, fats, tallow, etc. Nominal capital, £1,000 in £1 shares.